

Current Researches in Educational Sciences

Cetinje 2020



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Editors

Doç. Dr. Harun Şahin
Assoc. Prof. Dr. Ruhi İnan

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PREFACE

The book “Current Researches in Educational Sciences” is serving an academic forum for both academics and researchers working in such fields. Educational research is an interdisciplinary by nature. So it covers several fields such as educational sciences and social sciences. In this book, the academics working in different fields share their results with the scientific community. Thus more researchers will be aware of these studies and have some new ideas for their future studies. The selected articles have been reviewed and approved for publication by referees. It is hoped that the book will be of interest and of value to academics and researchers.

We would like to take this opportunity to thank all our colleagues and writers for their efforts.

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A STUDY ON THE RELATIONSHIP BETWEEN GOVERNANCE AND ORGANIZATIONAL TRUST IN SCHOOLS*

*Sedat Alev** & Fatih Bozbayındır****

1. Introduction

Today, the changes occurring in social life demonstrated their effects on many fields, just as on the field of administration, and the paradigm of this new period was called “governance” (Tunç, İnandı, Öksüz & Çal, 2013). The terms, administration and governance, are used in different meanings from each other. Just as the differences between a salute and greeting or transmit and communication, a difference between administration and governance can be noticed. The same saluting is one-way while the greeting is reciprocal and transmit is one-way while communication covers the reciprocal process, administration expresses the one-way control while governance covers acting together and in a collective way. The most important element that distinguishes governance from the administration is the fact that administration is shared among parties and the distinction between governing-governed is reduced by the established communication and shared authority (Acar, 2017). The concept of governance first officially appeared in the Report of the World Bank published in 1989 (Zabçı, 2002). It was expressed as a novel method regarding a novel administration process or how society will be governed (Rhodes, 1996). Governance is defined within various forms such as an order or a structure that is the result or product of the intervention attempts of all the related actors in a sociopolitical system (Kooiman, 1993) and a cyclical process that enables intra-organizational training through developing communication and relationship system, enabling interaction and participation, sharing the power and sharing the knowledge offered by technological infrastructure and that contributes to the emergence of professional synergy (Metin, 2011). Governance, based on its content, makes the organizational life richer with the emphasis on communication and cooperation that are included in its body and further motivates each individual to achieve organizational aims (Fidan, 2011). Briefly expressed, the cooperation of employees in the organization according to the aims of

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organizations and the playing active roles in the works to be done can be evaluated as the reflections of governance on the organizational environment.

The term, corporate governance, means that the organization is administered together with all parties while administrative actors control the actions regarding administration in the organization (Gündoğan, 2007; Memduhoğlu, 2010). Corporate governance consists of four main principles as equality/fairness, transparency, responsibility and accountability (OECD, 2004; SPK, 2005; Eroğlu, 2012; Sönmez & Toksoy, 2011). Equality can be defined as the evaluation of similar events in daily life in an objective way (Aslan, Usta & Şen, 2017). Transparency is the state where both decision-making processes and decisions are open and shared with other parties and access to information about methods and principles regarding the institution (Maliye Bakanlığı, 2003). As the transparency increases in organizations, features such as fairness, accountability and trust also increase; as a result, the attitudes and behaviors of employees toward organizing and administration become more positive (Bozbayındır, 2016). Responsibility means that organizations create value for shareholders while maintaining their activities according to laws, regulations, ethical principles and rules that reflect social values (TKYD & Deloitte, 2006). Accountability is a proactive process that requires informing about plans, behaviors and results of the works that are done. In organizations without accountability, behaviors and practices that are uncertain, irregular and unequal occur. In this case, the chances of employees to express their thoughts in an open way decrease (Kalman & Gedikoğlu, 2014).

As a result of the changes in producing knowledge, sharing it and methods of accessing knowledge, which meet the needs of society, education institutions, which are obliged to conduct the necessary change and renewal in terms of organizational operation, are required to be administered effectively to fulfill these functions (Memduhoğlu, 2010). Şişman and Turan (2003) stated that in the recent years, the changes experienced in the world affected education and school administration and practices (School-centered Administration, Restructuring in School Administration) that stipulate active participation of local government, education authorities and parents—briefly, all the shareholders in schools—in decision-making processes by moving away from centralization in education administration gained importance. Backmen and Trafford (2007) stated that governance in school has positive effects on discipline and learning and it would decrease possible conflicts between individuals. As can be understood from these statements, the dominance of governance in schools will affect education activities positively.

To maintain governance effectively in schools and to achieve success, the principles of governance should be implemented together (Yüner, 2018). One of the most important principles in effective corporate governance is that all shareholders access information regarding the administration and its functions easily, conduct effective supervision and thus, ensure trust in shareholders (Gedikoğlu, 2012). Accountability in the field of education requires the responsibility to be taken in success and failure situations resulting from current practices by serving the development of education, teaching and education methods (Sato & Rabinowitz, 2010). Anderson (2005) stated that accountability was one of the most important tools in achieving the aims of the education system. As an important element in school administration, the awareness of teachers about the administrative works and practices of the school is an important factor in terms of achieving the aims of the schools. The awareness of teachers about the school administration will be possible by their participation in decision-making processes in the school (Uğurlu, 2013). Transparency is the practice of helping education employees to adopt the work environment and to feel safe in this environment (Karaevli & Levent, 2014). The role of teachers' trust in the school and their colleagues is an important one in terms of conducting governance in schools effectively. In fact, various studies (Norman, Avolio & Luthans, 2010; Meier, 2002; Yanık, 2012) concluded that organizational trust and governance had a close relationship and high levels of governance in schools positively predicted the organizational trust.

Today, the concept of trust lies within the foundation of modern administration approaches that place individuals in their centers (Yılmaz, 2005). The concept of trust, which is defined in various ways in the literature, is the belief of an individual in the honesty, reliability and sufficiency of other individuals in the environment (Mishra, 1996; McKnight, Cummings & Chervany, 1998) and the prediction of individuals about what other individuals can or cannot do in possible situations (Özer, Demirtaş, Üstüner & Cömert, 2006). Additionally, trust covers expectations, predictions and beliefs about the probability of another individual's actions to be beneficial, favorable or deterrent to the self-interest of the individual at least (Robinson, 1996). Organizational trust is expressed as the trust of employees in the organization they are in (Zaheer, McEvily & Perrone, 1998), and their perception towards the support provided by the organization and the belief to leaders' truthfulness and standing behind their words (Demircan & Ceylan, 2003).

Trust, which is one of the most important elements of organizational life (Yanık, 2012), has an important place in creating relationships between administrators and employees in the organization and maintaining them

(McAllister, 1995; Türköz, Polat & Coşar, 2013). When the trust of employees to themselves, their administrators and colleagues increase, it is expected that the efficiency and productivity of the organization also increase (Asunakutlu, 2002). Providing timely and accurate information about the subjects related to the organization to all shareholders enables the creation of a trust-based environment in the organization (Kalman & Gedikoğlu, 2014). Organizational trust develops depending on factors such as having an open communication environment in the organization, assuming active roles in decision-making processes by employees and sharing feelings and expectations accurately (Gilbert & Tang, 1998). Decreases in organization trust result in negative effects on access to information and communication while weakening the decision-making process due to a lack of chances to share information and decreasing the quality of decisions that are taken (Madison, 2002, as cited in Asunakutlu, 2002). On this subject, Su-Yueh et al. (2015) stated that a reassuring atmosphere has positive effects on cooperation, effective communication and sharing information.

Çağlar (2011) stated that an organizational culture based on trust should be created for education organizations, where human relations are experienced intensely, to deal with uncertainties resulting from changes and renew themselves according to the needs of the era. Similarly, Arslan (2009) stated that trust in schools, which are open and social systems, has strategic importance and it plays important roles in achievements in schools where various shareholders (administrators, teachers, students and parents) exist together. The organizational trust level of the school is a product of the relationships in the school. Everyone is responsible for the type of relationship in the school and the trust resulting from that (Yılmaz, 2006). Tschannen-Moran and Hoy (1998) emphasized that trust was a significant factor to increase success in schools and enable teachers and administrators to create a healthy communication environment. In addition to teachers' trust to administrators, colleagues and other shareholders they work with, it is believed that trusting these three parties equally affects the work undertaken positively (Baş & Şentürk, 2011). Trust is also closely related to governance principles. As a result of a study conducted by Norman, Avolio and Luthans (2010), it was found out that transparency had a positive effect on trust. Trust in schools is a phenomenon that covers accountability, achievements and democracy (Meier, 2002). Participation of employees in the decision-making process and assigning authorities and responsibilities to them regarding the decision to be taken to increase the sense of trust (Yanık, 2012). For schools to achieve their missions and visions more effectively and to maintain them, it is deemed important to ensure the participation of teachers, parents and other shareholders in the

decision-making process about schools. Accordingly, in this study, it was aimed to determine the relationship between governance and organization trust in schools. Based on this main aim, answers to the following questions were investigated.

1. What are the perception levels of teachers regarding governance and organization trust in schools?
2. Is there a significant relationship between governance and organization trust in schools?
3. Does equality/fairness and transparency sub-dimensions of governance significantly predict organizational trust?
4. Does responsibility and accountability sub-dimensions of governance significantly predict organization trust?

2. Method

2.1. Research Design

In the current study, which investigates the relationship between governance and organization trust in schools, the relational screening model that aims to determine the relationship and relationship level between two or more variables (Fraenkel & Wallen, 2006; Karasar, 2015) was used.

2.2. Population and Sample

The population of the study consisted of primary schools in Gaziantep in the 2015-2016 education period while the sample of the study consisted of 341 teachers who served in these primary schools and who were chosen by the simple random cluster sampling method. Of the teachers included in the sample, 44.6% were males (n=152) while 55.4% were females (n=189), and 64.8% were married (n=221) while 35.2% were single (n=120). According to age groups, 43.1% of the teachers were between 21 and 30 years old (n=147) while 44.6% of them were between 31 and 40 years old (n=152) in addition to 12.3% of them who were 41 years old and above. The ratio of teachers who had undergraduate degrees was 93.5% (n=319) while 6.5% of them (n=22) had postgraduate degrees.

2.3. Data Collection Tools

The data of the study was collected via the “Corporate Governance Scale” and “Organizational Trust Scale”. The items in the Corporate Governance Scale, which was developed by Mert (2012), were adapted to schools to be used in the study. In the adaptation process of the scale, opinions of three experts in the field of educational sciences and two teachers (postgraduate students in the field of education management and

teachers of Turkish) were received. Following the pilot study, the scale was finalized by conducting a confirmatory factor analysis (CFA). The scale consisted of 20 items, which are scored with a 5-point Likert scale, and four sub-dimensions as equality/fairness, transparency, responsibility and accountability. The Organizational Trust Scale, which was developed by Yılmaz (2006), is scored with a 5-point Likert scale and consists of three sub-dimensions as trust in administrator, trust in colleague and trust in shareholder and 22 items. As a result of CFA, the three-factor structure of the scale was also confirmed in the sample of the study.

2.4. Validity and Reliability Studies

As a result of the factor analysis conducted on the corporate governance scale, it was determined that the scale consists of two sub-dimensions: equality/fairness and transparency, and responsibility and accountability. For the Corporate Governance Scale, the Cronbach Alpha reliability coefficient was .90 for equality/fairness and transparency sub-dimensions while it was .85 for responsibility and accountability sub-dimensions. The Cronbach Alpha reliability coefficient for the whole scale was calculated as .93. For the Organizational Trust Scale, the Cronbach Alpha reliability coefficient was calculated as .94 for the trust in the administrator sub-dimension while it was .94 for the trust in colleagues in addition to .92 for the trust in shareholders sub-dimension. The Cronbach Alpha reliability coefficient for the whole of the scale was calculated as .91. In the study, confirmatory factor analyses (CFA) were conducted for the construct validity of the scales. In CFA, the most commonly used values by researchers are χ^2 , χ^2/df , RMR, RMSEA, GFI, AGFI, NFI, IFI, CFI and TLI values (Meydan & Şeşen, 2015). Thus, these values were presented in the results of the CFA analyses conducted for the scales.

Table 1. Fit Values Obtained as a Result of CFA

Fit Values	Acceptable Values	Corporate Governance Scale	Organizational Trust Scale
χ^2	-	339.577	281.600
χ^2/df	$\leq 4-5$	2.326	1.717
RMR	0.06 – 0.08	0.041	0.028
RMSEA	0.06 – 0.08	0.062	0.046
GFI	0.89 – 0.85	0.905	0.924
AGFI	0.89 – 0.85	0.876	0.903
NFI	0.94 – 0.90	0.915	0.950
IFI	0.94 – 0.90	0.950	0.979
TLI	0.94 – 0.90	0.941	0.975
CFI	≥ 0.95	0.949	0.978

When the fit values presented in Table 1 were examined, it was observed that the obtained values provided proofs regarding that the scales were structurally fit (Kline, 2011; Meydan & Şeşen, 2015).

3. Findings

In the study, descriptive statistics and correlation coefficients for governance and organizational trust were calculated. The results of the analyses were presented in Table 2.

Table 2. Descriptive Statistics and Correlation Coefficients

Variables	\bar{X}	SD	SE	1	2	3	4
1. Equality/Fairness and Transparency	3.45	.82	.04	1			
2. Responsibility and Accountability	3.37	.72	.04	.804**	1		
3. Governance	3.41	.73	.04	.950**	.949**	1	
4. Organizational Trust	3.65	.54	.03	.244**	.311**	.292**	1

*p<.05, **p<.01, ***p<.001

When the values presented in Table 2 were examined, it was observed that the means for the variables were partially high in the forms of equality/fairness and transparency (3.45), responsibility and accountability (3.37), governance (3.41) and organizational trust (3.65). As a result of the correlation analysis, it was determined that governance in general and its sub-dimensions had a positive and moderate-level relationship with organizational trust.

In the study, each sub-dimension of governance, equality/fairness and transparency along with responsibility and accountability, was regarded as the predictor (independent) variables while the organizational trust was regarded as the predicted (dependent) variable. In the stepwise multiple regression analysis, gender (dummy) and age variables were taken under control in the first step. The values obtained as a result of the stepwise multiple regression conducted for equality/fairness and transparency's prediction of organizational trust were presented in Table 3 below.

Table 3. Results of the Regression Analysis Conducted for Equality/Fairness and Transparency's Prediction of Organizational Trust

Model 1	Predictor Variables	B	SE	β	t	p
1 st step (Enter)	Constant	3.51	.15		23.07	.00***
	Gender (dummy)	.01	.06	.01	.23	.81
	Age	.00	.00	.05	.95	.34
2 nd step	Constant	2.98	.18		15.98	.00***

Gender (dummy)	.01	.06	.01	.16	.87
Age	.00	.00	.04	.77	.44
Equality/Fairness and Transparency	.16	.04	.24	4.58	.00***

$R^2_{\text{change}} = .058$; * $p < .05$, ** $p < .01$, *** $p < .001$

As can be seen in Table 3, in the regression analysis, gender and age variables were taken under control in the first step. In the second step, it was concluded that equality/fairness and transparency positively and significantly predicted organizational trust ($\beta = 0.24^{***}$, $p < 0.01$). An increase of 1 unit in equality/fairness and transparency results in 0.24 units of an increase in organizational trust; equality/fairness and transparency explain 5.8% of organizational trust ($\Delta R^2 = .058$, $p < 0.01$). In other words, equality/fairness and transparency is a significant predictor of organizational trust.

The results of the stepwise multiple regression analysis for governance's responsibility and accountability sub-dimensions' prediction of organizational trust were presented below.

Table 4. Results of the Regression Analysis Conducted for Responsibility and Accountability's Prediction of Organizational Trust

Model 2	Predictor Variables	B	SE	β	t	p
1 st Step (Enter)	Constant	3.51	.15		23.07	.00***
	Gender (dummy)	.01	.06	.01	.23	.81
	Age	.00	.00	.05	.95	.34
2 nd Step	Constant	2.77	.19		14.61	.00***
	Gender (dummy)	.03	.06	.02	.46	.65
	Age	.00	.00	.03	.56	.58
	Responsibility and Accountability	.23	.04	.31	5.98	.00***

$R^2_{\text{change}} = .096$; * $p < .05$, ** $p < .01$, *** $p < .001$

According to Table 4, after gender and age predictor variables were taken under control in the first step, it was concluded that responsibility and accountability significantly predicted organizational trust in the second step ($\beta = 0.31^{***}$, $p < 0.01$). Accordingly, an increase of 1 unit in responsibility and accountability results in 0.31 units of increase in organizational trust. 9.6% of organizational trust ($\Delta R^2 = .096$, $p < 0.01$) is explained by responsibility and accountability. In other words, responsibility and accountability are significant predictors of organizational trust.

4. Discussion, Conclusion and Suggestions

As a result of the study that investigated the relationship between governance and organizational trust in schools, it was determined that the perceptions of teachers towards governance in schools were partly at a high level. Similar to the findings of the study, in a study conducted by Aslan (2016), it was concluded that governance in schools was at high levels. On this subject, Backmen and Trafford (2007) stated that governance is necessary in schools due to various reasons (ethics, politics, changes, etc.) and emphasized that governance was important in schools. Lewis and Pettersson (2009) stated that governance had a significant role in increasing performance in education. In other words, high levels of governance in schools create positive effects on education activities.

Another finding obtained in the study is that organizational trust levels of teachers were partly at a high level. In various studies, it was determined that organizational trust levels of teachers were high (Polat & Celep, 2008; Taşdan & Yalçın, 2010; Baş, 2010; Baş & Şentürk, 2011; Öztürk & Aydın, 2012; Gökduman, 2012; Uğurlu & Arslan, 2015; Altunay, 2016). Çağlar (2011) stated that an organizational culture based on trust should be created in schools where human relations are experienced intensely while Arslan (2009) stated that trust had strategic importance between shareholders of schools. Tschannen-Moran and Hoy (1998) stated that trust was an important factor for teachers and administrators to establish a healthy communication environment and to become successful. Related to trust in schools, Baş and Şentürk (2011) emphasized that teachers' trust in administrators, colleagues and other shareholders of schools affected the work they would do positively. Similarly, Yılmaz (2006) stated that in the process of establishing an environment of trust in schools, it is necessary for shareholders (administrator, assistant administrator, teachers, etc.) to gather around a common goal and feel responsible for each other.

According to the findings obtained from the results of the stepwise multiple regression analysis, governance practices in schools positively and significantly predict organizational trust. Regarding the equality/fairness and transparency sub-dimensions of governance, several studies (Konovsky & Pugh 1994; Cohen-Charash & Spector, 2001; Tarter & Hoy 2004; Atalay, 2005; Çakar, 2008) concluded that fair practices of school administrators resulted in positive effects on organizational trust. Özler and Yıldırım (2015) stated that the characteristics of administrators, such as keeping their promises and behaviors such as being consistent and fair, were effective on employees' trust in administrators. Tarter and Hoy (2004) stated that it is important for administrators in school environments to consider fairness and transparency principles in their relationships with

teachers and create a culture based on trust while reporting that the fairness and transparency sub-dimensions of governance had positive effects on organizational trust. These results support the finding in the study that equality/fairness and transparency in schools were significant predictors of organizational trust. In fact, they support the results of the study as well. In a study conducted by Norman, Avolio and Luthans (2010), it was found out that transparency had positive effects on trust. Regarding transparency, Gilbert and Tang (1998) stated that the existence of open communication in organizations enabled employees to assume active roles in the decision-making process and increased sharing of information. Accordingly, it is possible to state that the trust will increase in organizations where the principle of transparency is dominant. Conversely, with the decrease in organizational trust, negative effects on access to information and communication occur while decision-making processes are weakened and the quality of the decisions that are taken decrease because it is impossible to share open and accurate information (Madison, 2002, as cited in Asunakutlu, 2002). Regarding responsibility and accountability sub-dimensions of governance, Meier (2002) stated that trust was closely related to the governance principles while trust in schools covered accountability, achievements and democracy. In terms of educational institutions, the behaviors, decisions and strategies adopted by employees of schools to achieve predetermined aims constitute a subject that needs to be investigated within the scope of accountability (Kalman & Gedikoğlu, 2014). Regarding the responsibility principle of governance, Yanık (2012) stated that the participation of employees in the decision-making process and assigning them authorities and responsibilities about the decision to be taken increased their sense of trust while citing the relationship between governance and trust. As can be understood from these statements, the findings of the study that responsibility and accountability sub-dimensions of governance positively and significantly predicted organizational trust is supported by similar studies in the literature.

In the conclusion of the study, it is possible to present various suggestions to implementers and researchers. For implementers, because schools are institutions that are affected by changes in the environment while having an effect on their environments at the same time, it is deemed important to create an understanding of participatory administration where all shareholders can contribute to decisions regarding the school by changing the classical means of administration and decision-making. At this point, instead of a strict way of administration, it is necessary to create a trust-based school environment where all shareholders participate in the process actively and concepts of accountability, equality, responsibility and transparency come to the forefront while development becomes

continuous. For researchers, studies can be conducted at different education levels and with different samples. Studies can be conducted to investigate the effects of variables that are related to governance, such as school culture, organizational devotion, organizational citizenship, organizational identification, on the principles of governance (equality/fairness, transparency, responsibility and accountability). Furthermore, qualitative or mixed-method studies can be conducted to investigate the relationship between the variables in further detail.

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A CRITIQUE ON GAMIFICATION OF LEARNING

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Introduction

This paper provides a critical view of gamification, describes its principles and mechanisms, reviews evidence of its effectiveness, and provides recommendations that the success of gamification principles are closely linked to educational technology. Besides, the paper examines the relationship between gamification and behavioural changes in education, supports the role of educational technologies in the development of behavioural changes in children and their impact on their educational outcomes, describes their mechanisms and examines their possible negative impact on students.

Games

Gamification aims to exploit the popularity of games to transform everyday activities so that they have a positive impact on people's lives. Why do people use gamification services, and why does it work? Badges, leaderboard, levels, fantasy and challenges in games have the potential to improve student motivation, satisfaction and empowerment through increased engagement.

Gamification is a new trend that involves the integration of game elements into non-game applications (Cheong, Filippou, & Cheong,2014). This emerging concept used in areas such as marketing, but is also increasingly being applied to learning. Things, systems, and activities are being examined, and researchers are examining the ubiquity of games and their acceptance over time.

Digital games are enormously popular with digital natives, and they use them for entertainment but also educational purposes such as learning, social interaction or social networks (Khardage, Lattemann, & Acosta-Díaz 2014). Entertainment and gamification are becoming increasingly necessary, and the number of games available on the market is proliferating, both for entertainment and educational purposes.

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Edutainment and gamification are becoming increasingly important, and games have entered a new era in which their purpose is not only educational but even more critical than ever. According to the literature on gamification, the article implies vital warnings that teachers can use to introduce interactive game elements to the classroom peacefully and engagingly.

Game Elements, Game-Based Learning And Gamification

Gamification involves the use of game elements outside of a game and in principle, any logical task can be gamified (Landers, 2014). The regular design patterns of game design, known as "game elements," are known to all game designers, but not to the public education system. These elements have different purposes and can be adapted to work-related business or training environments, but they must have a different purpose. Considering the seven rhetorics of (play – progress, fate, power, identity, imaginary, self and frivolity) – can help to understand components of a game holistically (Nolan, McBride 2014).

Main principles of gamification are goal orientation, achievement, reinforcement, competition, and fun orientation. As a production tool, instructional designers need a road map and a component list of gamification. Therefore system design elements for gamification are revealed such as leaderboards, levels/milestones, points, onboarding, challenges/quests, badges, immediate feedback, social engagement loops, teams/social dynamics, rules, economies, visuals/sounds, avatars, customization, narrative context, roleplay. (Nah, Telaprolu, Rallapalli, Venkata, 2013).

There is the term "gamification," and many authors differentiate on the term by referring to how it is implemented. The playful design is "integrated design from the ground up", and it is about integrating design into the design. In principle, tasks can be gamified, and gamification is about complementing existing platforms, curricula, services (Cugelman, 2013).

Although gamification involves the use of game elements outside of a game, the core definition is that the game is not created solely. Instead, it expands existing processes by taking over functions from games.

One of the aims of educational criticism is to shed light on what the author meant by "gamification" and its use in non-game-related environments. The concepts of game-based learning and gamification remain sufficiently different in practices but exist in similar motives and mutually promote each other.

Game-based learning and gamification are two similar terms. The former refers to the acquisition of games for educational purposes, and the latter is the use of a game as a means of learning for educational and research purposes. In this emerging field, the term "gamification" is still in flux and can be used in different ways and often misused in different contexts.

The Gamification Of Learning

The primary purpose of the school today is to find ways to solve the problem, motivate it and engage students. The potential of games to improve learning performance has been anticipated from the past. As if supporting this goal, Skinner (1984) suggests that a game increases learning success as an indicator of not only student performance but also the quality of instructional design. Over thirty years since this interpretation, game design has continually improved and has become even more successful (Morford, Witts, Killingsworth, Alavosius, 2014).

One of the goals of gamification learning is to stimulate the same motivation and commitment that the player has when playing like the learner. The aim is not only to improve learning by increasing the motivation or commitment of learners but also to increase the degree of involvement in the learning process and the overall learning experience.

In the case of learning, the student is an actor in the system, and in order to successfully use learning with better motivation and engagement, it is necessary to understand the students and their views on this issue. However, gamification is not an easy process and can be quite complicated to implement correctly. It is not just a question of complementing an existing game process or system, but also of developing new ones. It is about understanding the player, determining what to do and motivating them to act through appropriate game elements.

In order for gamification to be embedded in a learning environment, it is necessary to obtain an opinion on how personality traits and learning styles affect the gamification preferences of the individual. This obligation is one of the reasons why gamification is complicated and challenging to implement. (Buckley, Doyle, 2017).

Criticisms On Gamification Of Learning

Rughinis notes that the gamification of education can become exploitative if it becomes an excuse to facilitate inadequate learning. One of the most exciting criticisms of gamification revolves around the concept of external rewards and intrinsic motivation. Motivation can be divided into two categories: extrinsic and intrinsic and a meta-analysis has shown

that intrinsic motivations, such as free choice, are substantially undermined by external incentives, such as rewards from external sources (e.g. games).

If an action is carried out based on the existing extrinsic motivation, the aim of that action is not the action itself, but something else. For example, engagement depends on completing any reward undermines self-interest due to the expected reward. In other words, external rewards undermine intrinsic motivation, but the goal of gamification always remains something other than the gameplay itself. Since the goals of gamification are always steeped in something other than the gameplay itself, it is evident that what motivates people to engage in gamified applications is almost always extrinsic. Gamification brings people playing games for their own sake, not for the sake of the game itself. Gamification, on the other hand, only works when it puts gamification in the hands of people who play a game for their purposes, not as a reward. Some negative findings suggest that, at best, it does not improve educational outcomes and, at worst, can harm motivation, satisfaction, and empowerment (Hanus, & Fox 2015)

Discussion

Gamification of learning projects offer the opportunity to experiment with rules, emotions and social roles. As gamification spreads to the real world, there is no doubt that it will also have an impact on schools. It is not a panacea, but gamification will be a part of every student's life for years to come. As long as people are instinctively and naturally satisfied with playing games, most gamification projects will succeed in the short run regardless of their strengths and weaknesses, will succeed.

On the other hand, gamification can lead to diminishing students learning outcomes by the exploitation of motivation sources in the long term. We need a game-friendly education policy, but we have yet to address whether this approach has been widely successful in all ages and varied skilled students (Hamari, Shernoff, Rowe, Coller, Asbell-Clarke & Edwards 2016).

Gamification of learning is a complicated process to consider, as with all multi-parameter facts such as individual differences, chosen learning approach, instructional design, technology and methods. Therefore gamifying learning effectively is not easy (Dicheva, Dichev., Agre, Angelova, 2015).

Despite all these difficulties, it is a hopeful area worth working. Above all, gamification activities designed based on instructional technologies are likely to be successful.

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TRENDS OF DISSERTATIONS WRITTEN IN TURKEY REGARDING ARTS AND DRAMA AND VIEWS OF ACADEMICIANS¹

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Introduction

As they are used at every stage of education and teaching, drama and art have always influenced each other. According to Aykaç (2007), creative drama is also an art education because drama may contain the objectives, principles and contents related to all fields of study of art education. Furthermore, drama is a teaching method capable of improving the creativity and a field in itself which raises creative individuals. Drama improves the imagination of individuals by supporting the development of their intrinsic creativity. Drama also enables the students acquire various skills pertaining to their personal development and helps them to develop sophisticatedly. For this reason, drama is a useful method for personal development. Having three dimensions in education as a method, a branch of art and a discipline, drama is defined as the fictional representation of any incident by way of techniques such as improvisation or role playing as a group by looking at the knowledge and lives of the members of the group (Adıgüzel, 2006, p.21). When historical process of drama is examined, it is seen that those who have brought this concept in the field, believe that it should be a part of education and ensure the development of drama in this direction are not distant from the art. The art springs from life and the drama from art. While it is possible to teach everything based on cognition to students by way of drama techniques, it is inevitable to use drama activities in art lessons (Apaydın, 2010). Consequently, the significance of

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art in personality development of students cannot be denied. Most particularly, when it is considered that a good part of the personality of children develops during their elementary education, the art and art education play a significant role in enabling the students gain awareness of social and cultural issues. From this aspect, art education and particularly drama activities are important as they make the students ready for their roles, responsibilities and experiences as adults in their future lives and improve cognitive, affective and aesthetic creativity of the students both in the school and community (Aykaç, 2007). As the primary objective of art education lessons is improving the creativity of children, teachers should make these lessons more efficient and entertaining and include activities which would stimulate the imagination of children. One of the most convenient ways for this is playing games and impersonating others (Öztürk, 2009). It should not be ignored that art education and particularly drama accelerates moral, cultural, mental, linguistic and physical development of children and teenagers in school and community and makes the students ready for their future responsibilities and experiences as adults (San, 1991). The objective of art education in schools is developing the students intellectually, perceptively and emotionally. For this reason, the power of art in education is an indisputable fact. Art education should be given everywhere and anytime (Kaya, 2006).

Literature review reveals that the number of studies on art and drama is rather limited. Among these limited number of studies, it is seen that Balıkçı (2001) has examined the impact of drama in the influential and informative fields of scientific and artistic education. Akyüzlüer (2007) has examined the impact of drama method on development of musical abilities of 4th grade students by using an experimental method. In her study, Apaydın (2010) included the opinions of 4th grade students regarding the drama activities performed in visual arts course. In the study of Keyik (2011), it was aimed to identify the creative drama activities applied by art educators in painting departments of Fine Arts High Schools in their lessons, conditions of applying these activities and the views of the teachers. In his study, Arıkan (2011) tested whether the creative drama method makes a positive contribution to the field of art education or not. Çakır İlhan (2007) conducted a study on the similarities of educational approach of creative drama and today's sense of art.

Method

In the research, document analysis method was used within the scope of qualitative research. Document analysis mostly supplement other research methods, but it can also be used as a method by itself. Document analysis

is used to review and evaluate the printed and electronic documents (Bowen, 2009). O'Leary (2017) states that the document analysis is a research tool used to collect, review, query and analyze various written text forms as the sources of primary research data. The data obtained from the study were analyzed by content analysis and descriptive analysis. Content analysis is a basic research tool used to find answers to many research questions in different disciplines (Koçak and Arun, 2006). In content analysis, similar data are brought together within the frame of certain concepts and themes, and they organized and interpreted in the manner that the readers can understand (Yildirim and Şimşek, 2006). Descriptive analysis is composed of four phases, namely forming a frame for descriptive analysis, processing the data in accordance with the thematic frame, identification of findings and interpretation of findings (Altunışık et al., 2010). In this analysis, the data obtained from the interviews are converted into numerical data by using a coding system and analyzed. Although it is a complex and difficult method, it ensures obtainment of the data which are difficult to reach. Dissertations on art and drama were searched on the "advanced search" tab of the DISSERTATIONS page of YÖK (Council of Higher Education) by selecting the "allowed" option. The dissertations were downloaded on 21.12.2017 between the hours of 15:53-16:10 PM by using the keywords of "drama-art, drama-painting, drama-visual arts, drama-music and drama-sculpture". Even though 20 dissertations were found in the first stage, one of them appeared to be a joint dissertation when the search was carried out by using the keywords of "drama-art" and "drama-sculpture", thus only 19 dissertations were reviewed in the scope of the study. These dissertations are as follows: Öztürk (1996), Balıkçı (2001), Kaya (2006), Atan (2007), Önder (2007), Özcan (2007), Akyüzlüer (2007), Topcu (2008), Bağatır (2008), Apaydın (2010), Kök (2010), Sever (2010), Yılmaz (2010), Keyik (2011), Arıkan (2011), Oğuz (2013), Hamurculu (2016), Erdoğan (2016), Terzi (2017) .

Findings and Interpretation

Findings of the present study consist of two parts. The first part includes the trend of the undergraduate dissertations written in Turkey in the field of art and drama, and the second part includes the views of five academicians regarding use of creative drama method in art education lessons.

1. Trends of the Dissertations Written in Turkey on Art and Drama

Table 1. Distribution Of Dissertations By The Title Of Advisors

Title of the Advisor	Code	Frequency (f)
	Professor Doctor	7
	Doctor Professor	7
	Associate Doctor	4
Doctor	1	

Table 1 shows that the advisors of 7 dissertations were Professor Doctor 7 of them were Assistant Professors, 4 were Associate Doctor 1 of them was a Doctor.

Table 2. Distribution Of Dissertations By Their Dates Of Publication

Date	Code	Frequency (f)
	2010	4
	2007	4
	2016	2
	2011	2
	2008	2
	Other	5

Table 2 shows that 4 of the dissertations were published in 2010, 4 in 2007, 2 in 2016, 2 in 2011, 2 in 2008, 1 in 2017, 1 in 2013, 1 in 1996, 1 in 2001 and 1 in 2006. There is 1 dissertation published in each one of the years of 2017, 2013, 1996, 2001 and 2006 under the "Others" column.

Table 3. Distribution Of Dissertations By Universities

University	Code	Frequency (f)
	Gazi University	4
	Dokuz Eylul University	3
	Ankara University	2
	Selcuk University	2
Other	8	

Table 3 shows that 4 of the dissertations were written up in Gazi University, 3 in Dokuz Eylul University, 2 in Ankara University, 2 in Selcuk University, and 1 of the dissertations in the "Other" column was written up in Cumhuriyet University, 1 in Nigde University, 1 in Osmangazi University, 1 in Anadolu University, 1 in Abant Izzet Baysal University, 1 in Hacettepe University, 1 in Akdeniz University and 1 in Cukurova University.

Table 4. Distribution Of Dissertations By Departments

Department	Code	Frequency (f)
	Department of Fine Arts	5
	Department of Art	3
	Department of Music Education	3
	Department of Visual Arts	3
	Department of Elementary School Teaching	2
	Other	3

Table 4 shows that 5 of the dissertations were written up in Department of Fine Arts, 3 in Department of Art, 3 in Department of Music Education, 3 in Department of Visual Arts, 1 in Department of Elementary School Teaching and 1 of the dissertations in "Other" column was written up in Department of Applied Arts, 1 in Department of Interdisciplinary Museum Education and 1 in Department of Classroom Teaching.

Table 5. Distribution Of Dissertations By Postgraduate Degree

Postgraduate degree	Code	Frequency (f)
	Postgraduate	14
	Doctorate	5

Table 5 shows that 14 dissertations were postgraduate and 5 were doctoral dissertations.

Table 6. Distribution Of Dissertations By Methods

Code	Frequency (f)
Quantitative	12
Qualitative	5
Mixed	2

Table 6 shows that quantitative method was used in 12 dissertations, qualitative method in 5 and mixed method in 1.

Method	Code	Frequency (f)
	Experimental	11
	Survey model	3
	Descriptive research	3
Quasi-Experimental	1	

Table 6 shows that experimental method was used in 11 dissertations, survey method was used in 3, descriptive research method was used in 3 and quasi-experimental method was used in 1.

Table 7. Selection Of The Study Group For Dissertations

Selection of study group	Code	Frequency (f)
	Random assignment	13
	Random Selection	4
	Unspecified	2

Table 7 shows that random assignment was used in 13 dissertations, random selection in 4 and selection method of study group was not specified in 2.

Table 8. Study Group Level Of Dissertations

Study group level	Code	Frequency (f)
	Department of Elementary School Teaching	6
	Secondary Education	6
	University	4
	Group level is not specified	3
	Pre-school	1

Table 8 shows that 6 of the dissertations were selected at primary education level, 6 at secondary education level, 4 at university level, 12 at pre-school level and group level was not specified in 3 dissertations.

Table 9. Size Of The Study Group In Dissertations

Size of the study group	Code	Frequency (f)
	51-100	7
	1-50	6
	Group size was not specified	3
	101-150	1
	300 +	1

Table 9 shows that group size of 7 dissertations were in the range of 51-100, 6 in the range of 1-50, 1 in the range of 101-150, 1 in the range of 300+, and size of the group in 3 dissertations were not specified.

Table 10. Data Collection Tools Used In Dissertations

Data collection tools		Code	Frequency (f)
	Qualitative Data Collection Tools	Interview form	7
		Attitude scale	9

	Quantitative Data Collection Tools	Achievement test	8
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Table 10 shows that the data collection tool was attitude scale for 9 dissertations, achievement test for 8, interview form for 7, assessment scale for 4, worksheets of students for 3, observation form for 3, domestic and foreign written sources for 1, grading key for 1, questionnaire for 1, Likert scale for 1, information form for 1, video recordings for 1, diaries for 1, art criticism worksheet for 1 and personal information form for 1.

Table 11. Suggestions Regarding The Results Of The Research In Dissertations

	Code	Frequency (f)
	Suggestions regarding the results of the research	In-service training, courses and seminars should be organized
Drama workshops should be established		9
Drama should be a compulsory course		9
Researches on drama should continue		8
Lesson plans suitable for drama should be prepared		7
Drama should be considered as a method and discipline		6
Creative drama method should be expanded in art education.		5
Attitude scale for art should be developed		5
Drama should be used in music education		4
The same research should be made with other groups		4
Publications and sources regarding drama should be increased in number		3
Drama teachers should be trained		3
Tools and equipment should be provided for courses supported by drama		3
Curricula using drama method should be developed		3
Museum workshops should be established		2
Experimental researches should be made		2
The number of Visual Arts course hours should be increased		2
Institutions and universities should be in cooperation	2	

	Games should be investigated	1
	The number of students in a classroom should be decreased to use the creative drama method more efficiently	1
	Creative drama communities should be formed	1
	Foreign studies should be translated into Turkish	1
	Every academician should be encouraged to receive creative drama training	1

Table 11 shows that the researchers made some suggestions in accordance with the results of the studies conducted to write down their dissertations. These suggestions are as follows; in-service training, courses and seminars should be organized (12 researchers), drama workshops should be established (9 researchers), drama should be a compulsory course (9 researchers), researches on drama should continue (8 researchers), lesson plans suitable for the use of drama should be prepared (7 researchers), drama should be considered as a method and discipline (6 researchers), creative drama method should be used more commonly in art education (5 researchers), drama should support music education (4 researchers), same research should be made with other groups (4 researchers), the number of publications and sources related to drama should be increased (3 researchers), drama teachers should be trained (3 researchers), necessary materials should be provided for courses supported by drama (3 researchers), curricula encouraging the use of creative drama method should be developed (3 researchers), museum workshops should be established (2 researchers), experimental researches should be made (2 researchers), the number of visual art lessons should be increased (2 researchers), institutions and universities should cooperate (2 researchers), games should be investigated (1 researcher), number of students in a classroom should be decreased to use the creative drama method more efficiently (1 researcher), creative drama communities should be formed (1 researcher), foreign studies should be translated into Turkish (1 researcher), every academician should receive creative drama training (1 researcher).

Table 12. Keywords Used In Dissertations

Keywords	Code	Frequency (f)
	Creative Drama	6
	Drama	3
	Art Education	3
	Visual Arts	2

	Art	2
	Other	16

Table 12 shows that the following keywords were used in the dissertations; creative drama (6 dissertations), drama (3 dissertations), art education (3 dissertations), visual arts (2 dissertations), art (2 dissertations), interest in art (1 dissertation), achievement in art education course (1 dissertation), orffschulwerk (1 dissertation), attitude towards music course (1 dissertation), fine arts high schools (1 dissertation), drama teaching method (1 dissertation), basic design (1 dissertation), museum awareness (1 dissertation), creative drama in museum (1 dissertation), music course (1 dissertation), musical creativity (1 dissertation), 5th grade students (1 dissertation), visual arts education (1 dissertation), control group (1 dissertation), experimental group (1 dissertation), attitude scale (1 dissertation).

Table 13. Indices Used In Dissertations

Indices	Code	Frequency (f)
	Creative Drama	6
	Drama	5
	Art Education	5
	Visual Arts	3
	Music Education	2
	Museum Education	2
	Orffschulwerk	2
	Visual Arts Education	2
	Primary Education Schools	2
	Other	31

Table 13 shows that creative drama index was used in 6 dissertations, creative drama index in 5, drama index in 5, art education index in 5, visual arts index in 3, music education index in 2, museum education index in 2, orffschulwerk index in 2, visual arts education index in 2, primary education schools in 2 and other indices in 31. The indices included under the "other" column are pre-school children, children, teacher candidates, Ankara, museums, music course, music education, dramatization method, affective concepts, conceptual art, conceptual learning, secondary school students, art criticism, artworks, students, curricula, fine arts high schools, high schools, drama education, drama techniques, education, achievement of students, attitude of students, primary education, games, art education, creativity, children's games, student views, visual arts course, primary school students.

Table 14. Gender Of The Researchers Who Wrote The Dissertations

Gender	Code	Frequency (f)
	Female	15
	Male	4

Table 14 shows that 15 of the researchers who wrote the dissertations were females and 4 were males.

Table 15. Number Of Sources Used In Dissertations

Number of sources	Code	Frequency (f)
	1-50	8
	51-100	6
	101-150	3
	151-200	1
	200+	1

Table 15 shows that the number of sources in 8 of the dissertations were in the range of 1-50, in the range of 51-100 for 6, in the range of 101-150 for 3, in the range of 151-200 for 1 and 200+ for 1.

Table 16. Number Of Local Sources Used In Dissertations

Number of sources used in local dissertations	Code	Frequency (f)
	51-100	9
	1-50	8
	101-150	1
	150+	1

Table 16 shows that the number of local sources used in 9 dissertations were in the range of 51-100, in the range of 1-50 in 8, in the range of 101-150 in 1 and 150+ in 1.

Table 17. Number Of Foreign Sources Used In Dissertations

Number of foreign sources	Code	Frequency (f)
	0-50	18
	50+	1

Table 17 shows that the number of foreign sources used in 18 dissertations were in the range of 0-50 and 50+ only in 1.

2. Opinions of the Art Education Academicians regarding the Use of Drama in their Lessons

The academicians who lecture music courses, visual art courses and drama courses are coded as M1-M2, GS1-GS2 and D1-D2 respectively in this section.

Five academics who lecture art education course are still working in two different state universities in the Black Sea Region and three of them are males, two are females. Three of the academicians are in department of classroom teaching and two are in department of fine arts. Two of the academicians were graduated from department of music teaching, two from department of art teaching and one from classroom teaching. Two of the academicians got master's degree and three have doctoral degree. The academicians lecture courses of visual arts, music, art and aesthetics, aesthetic doctrines, art, drama, first reading and writing, Turkish language, written and verbal expression courses at the level of bachelor degree, and courses of analysis of children's paintings, reading and comprehension difficulties, creative writing, writing scientific articles at postgraduate level.

Methods and techniques used in art education lessons

The academicians stated that the methods and techniques they use in art education lessons are art criticism, expression, 5E model, classic method, orff, kodaly, suzuki, basic presentation techniques, question-answer, creative thinking techniques, show-do, improvisation, role playing, conscience alley, frozen picture (image), leader's role playing.

D1: "The drama has nearly fifty techniques and I try to make use of them. But I mostly use the drama techniques of improvisation, role playing, frozen picture (image), conscience alley, collection technique, leader's role playing."

GS2: "I usually use the art criticism method in art and aesthetics lessons."

M1: "I use general music teaching methods and techniques and special music teaching methods and techniques. Such as orff, kodaly music education, suzuki..."

Table 2. Opinions Regarding The Necessity Of Creative Drama

Code	Frequency(f)
Creative drama education should be received	3 (M1, GS1, D1)
It requires a field of specialization	2 (M1, GS1)
It decreases shyness and develops self-confidence	1 (GS2)
It is student-centered	1 (D1)
It should be used actively, beginning from pre-school period	1 (M2)
It is a part of life	1 (M1)
It requires experience	1 (GS1)

D1: “One of the best answers teachers can give to the question of how I can teach better. It is student-centered and based on interaction. It is a method and a discipline that can be used in every course, every field. That's why everyone should receive a good creative drama training.”

GS1: “Even if it always comes into question in education, actually it is not a simplified method. People are familiar with creative drama and drama but most of them have the wrong information about these concepts. I believe that creative drama can be applied properly only by receiving special training about creative drama and gaining experience. Otherwise it is hollow even if it is called as creative drama.”

M1: "Because creative drama is the life itself, I think it has a very important place as a course."

Do you use creative drama in art education lessons?

One of the academicians (GS2) stated that he/she uses creative drama in art education lessons, three of them (M2, M1, D1) stated that they use it to a certain extent and one of them (GS1) stated that he/she does not use creative drama. Views of the academicians are given below:

D1: “I cannot use it very often. I use it only if we include painting, music and rhythm literature when we discuss certain subjects. But if you ask me if I lecture art education directly, no, I can't”.

GS1: “Sometimes I use it. We examine the paintings of children. Sometimes we dramatize these paintings to empathize.”

M2: "I was using creative drama when we theoretically discuss the themes in music lessons in 2nd Grade. I was presenting the themes entertainingly

by playing games to teach how we can partition the themes as sounds or verses.”

Table 3. What Are Your Views On The Use Of Creative Drama In Art Education Lessons?

Code	Frequency (f)
Music and drama are interbedded	2 (M1, M2)
Making a story of it	2 (M1, D1)
Making the lessons entertaining	2 (M2, GS2)
It includes dramatization	2 (M1, GS1)
Teaching art movements	1 (GS2)
Permanent learning	1 (GS2)
Anticipation	1 (GS2)
Using materials	1 (M2)
Dancing	1 (M1)
Facilitating the process	1 (GS2)
Empathizing	1 (GS1)
Development of body language	1 (GS2)
Development of theatrical skills	1 (M1)
Self-discovery	1 (M2)
Learning how to fictionalize	1 (M2)

D1: “For example, when I discuss Beethoven's life, there is both music and literature in his life. Or when I study a story, there are paintings. It's about painting art. If this course continues for two or three semesters, we may perform studies related to art education.”

GS2: “It can be used to teach new art movements after criticizing the art because it is a challenging process. There are so many artists and artworks in certain art movements. The students should be able to keep these in mind. In this process, for example, I include the creative drama in the process in the following way: After discussing the artists and their works, we called the students to the blackboard towards the end of the lessons and asked them to mime.”

M1: “I did not have the training, but I personally try to improve my creative drama understanding. For example, rondos are directly related to drama. Rondos means dramatization. They are important because they present a story, a tale with music and include singing, playing an instrument and dancing.”

Table 4c. Opinions On How Creative Drama Is Used

Code	Frequency (f)
Fictionalizing the improvised text	2 (M2, D1)
Mime	2 (GS2)
Reviewing children's paintings	1 (GS1)
Preparing your own materials	1 (M2)
Combination of theater and music	1 (M1)
Literature	1 (D1)
Painting	1 (D1)
Music	1 (D1)
Turkish Language	1 (D1)
Rhythm	1 (D1)
Rondo	1 (M1)

M1: “Rondos means dramatization. They are important because they present a story, a tale with music and include singing, playing an instrument and dancing.”

GS2: “After discussing the artists and their works, we called the students to the blackboard towards the end of the lessons and asked them to mime. “

D1: “For example, I teach Beethoven's life with drama. Sometimes I do workshops on visual arts.”

Table 5. How The Creative Drama Plan Is Structured In Art Education Lessons

Code	Frequency(f)
Improvisation	3 (GS1, GS2, M2)
I am not preparing a written plan	3 (GS1, GS2, M1)
Using already written sources	1 (M1)
Having their own students prepare lesson plan	1 (GS2)
Five Ws	1 (D1)
Phases of drama	1 (D1)

GS1: "I use improvisation because there are things in our mind."

M2: “You must create drama techniques yourself, creative drama is free.”

D1: “We have five Ws questions. I structure this according to the questions of to whom I will apply it, why I will apply it, where I will apply it, when

I am going to apply it, and how I am going to apply it. First of all, I determine my objective and potential outcome'.

Table 6. What Are Your Views On The Relationship Between Art And Drama?

Code	Frequency(f)
Drama is a form of art	2 (M1, GS1)
It is a sub-branch of theater	1 (M1)
Both of them enable manifestation of emotions	1 (GS2)
Drama is an art education method	1 (GS2)
Both of them require creativity	1 (M2)
Drama is a field of art education	1 (D1)
Drama lives on art	1 (D1)
Both of them make the life aesthetic	1 (D1)
Fields of arts ensure permanence through drama	1 (D1)
Art is incorporated into the life through drama	1 (D1)

M1: “Drama is an art. It is included in a branch of art.”

GS2: “Drama and art is a form of interpretation through which the individual can associate his/her inner world and emotions with his/her daily life and seem them from a different perspective, in other words, manifest his/her inner world.

M2: “Drama is creativity, and art is also creativity.”

D1: “Drama is a field of art education. Drama lives well on art. Drama and art are a way of making life more aesthetic, more meaningful. Therefore, all fields of art can be more permanent and a way of life through drama”.

Table 7. Achievements And Skills That Students Can Acquire When Creative Drama Is Used In Art Education Lessons.

Code	Frequency (f)
Learning by having fun	3 (GS1, M1, GS2)
Empathy	2 (M1, GS1)
Ability to work with a group	2 (M1, GS2)
Permanent learning	2 (GS1, GS2)
Interest in the course	1 (GS1, GS2)
Self-confidence	1 (GS2, M2)
Critical thinking ability	1 (GS2, D1)
Respect	1 (M1)
Love	1 (M1)

Being happy	1 (GS1)
Ability of self-expression	1 (GS2)
Observation	1 (GS2)
Authentic thinking	1 (M2)
Aesthetic sensitivity	1 (D1)
Artistic awareness	1 (D1)
Conscious and qualified art literacy	1 (D1)
Interest in different arts	1 (D1)
Creative thinking ability	1 (D1)
Problem solving ability	1 (D1)

M1: "We can make the students feel empathy and also respect and love ..."

GS2: "Self-confidence improves. It develops critical thinking; students can approach an incident from a more critical perspective. They understand the importance of art. Also, the ability to work with a group is very important."

D1: "Aesthetic sensitivity, artistic awareness, and conscious and qualified art literates can be gained through drama. Apart from creative thinking, critical thinking, different perspectives, problem solving, and basic skills needed for drama, I think the most important thing is creating artistic awareness and a conscious art culture."

Table 8. Are There Any Difficulties Encountered When Using Creative Drama In Art Education Lessons?

Code	Frequency (f)
Yes	4
No	1

M1: "We have problems such as not having large, usable and airy workshops and lack of materials."

GS2: "There is no Internet connection in classrooms. For example, if you cannot a museum in person, you have to have a virtual tour but there is no Internet connection. Classes are so crowded. Our workshop can take 20 students at most, but I try to cram 40 students in."

D1: "Time limit is one of the biggest problems. Another one is attendance."

Table 9. If There Are Any Difficulties, What Are They?

Code	Frequency (f)
Experience of the leader	2 (GS1, M2)
Good infrastructure	1 (GS1)
Shyness of students	1 (GS2)

Insufficient physical conditions	1 (GS2)
Internet access problem	1 (GS2)
High number of students in a class	1 (GS2)
Time	1 (D1)
Low interest in art	1 (D1)
Attendance	1 (D1)

Table 10. What Are Your Solution Suggestions?

Code	Frequency (f)
Improvement of physical conditions	3 (M1, GS1, GS2)
Increasing the number of drama course hours	2 (GS2, D1)
Structuring large workshops	2 (M1, GS2)
Providing material support	2 (M1, M2)
Self-confident leader	2 (GS1, M2)
Orientation of teachers	1 (GS1)
Decreasing the class size	1 (M2)
Taking social status and perception levels into consideration	1 (M2)
Teachers should be able to prepare the materials	1 (M2)
Constructivist approach should be preferred	1 (GS2)
Teachers should improve themselves	1 (GS2)
Availability of a stage	1 (M1)
Cleanness of the space	1 (M1)
Raising awareness of art	1 (D1)
Increasing interaction with other courses	1 (D1)
Carrying out activities in concert	1 (D1)

D1: "Increasing the course hours of drama may necessitate interaction with other courses to introduce the difference of those products related to art."

GS2: "If I had a magic wand in my hand, I would change my physical conditions."

Conclusion

According to the findings of the study, the numbers of the advisors who are Professor Doctor and Assistant Associate Professors are equal and in majority and there are also dissertations written by Associate Professors and Doctors. Mostly experimental method is used in dissertations. Kaytez and Duralp (2014) revealed in their study that the experimental method was used at the most and supported the conclusion of the present study. It is seen that postgraduate dissertations were mostly written in 2007 and 2010. It was determined that Gazi University ranks first in distribution of

the dissertations by universities. Most of the dissertations were written in departments of fine arts education, art education, music teaching and visual arts teaching and more than half of them were postgraduate dissertations while a few are doctoral dissertations. Most of the reviewed dissertations were selected through random assignment, and the dissertations were generally handled at primary and secondary education levels. It is seen that the number of sources in the dissertations vary in the range of 51-100 at most and the number of sources in some of them were in the range of 1-50. Attitude scale, achievement test and interview form were the mostly used data collection tools. In accordance with the results obtained from the researches made when they write down their dissertations, a great majority of researchers suggested that in-service training, courses and seminars should be organized, drama workshops should be established, and drama should be a compulsory course. It was seen that the keywords of creative drama, drama and art education, and creative drama, drama, art education, visual arts indices were used. It is seen that more than half of the researchers who have written the dissertations were females and some of them were males. In consequence of the conclusions of the research it is suggested that the number of postgraduate and doctoral dissertations on art education and drama should be increased, more sources should be used in dissertations, and methods in which both qualitative and quantitative data collection tools are used in conjunction can be designed to prepare the dissertations. According to the views of the academicians, it is seen that the methods and techniques they use most in art education lessons are art criticism, expression and 5E model. The majority of academicians stated that creative drama training should be received. Academicians stated that they sometimes use drama in their art education lessons. It is also observed that the majority of the academicians use creative drama and music together in art education lessons. It is stated that the improvisation technique is used most in the scope of creative drama. The majority of academicians stated that drama is a form of art when they mention the relationship between art and drama. It is observed that the learning outcome for the students when creative drama is used in art education lessons is mostly explained as learning by having fun. It is observed that most of the academicians stated that they may encounter some difficulties when they use creative drama in art education lessons and these difficulties are based on reasons such as leader's experience and insufficient infrastructure. The academicians suggested that physical conditions should be improved, number of course hours should be increased, and necessary materials should be provided so that creative drama can be used more efficiently. By looking at the conclusions of the present study, it is suggested that studies on the relationship of drama, which is a field of art, with other branches of art can be conducted, creative drama can be

included in artistic processes more frequently, and the academicians who teach art education can use creative drama method to make the lessons more entertaining, creative and permanent.

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THE EFFECT OF ACTIVITIES DESIGNED WITH LEARNING STRATEGIES ON STUDENTS' USE OF LEARNING STRATEGIES IN VIOLIN EDUCATION¹

Şenol Afacan & Şeyda Çilden***

INTRODUCTION

Violin education is a long process in which technical and complex skills are gained and developed, and encompasses cognitive and affective objectives, as well as psychomotor learning. Şendurur (2001) defines violin education as the process of causing desired changes in the behavior of the individual and transforming them into skill. Fine arts high schools, where the basic behaviors of vocational music education and, accordingly, violin education are gained and developed, are institutions aiming to train individuals who are in command of their instruments in higher education. The learning objectives during this process also affect the quality of violin education and training in higher education.

Demonstrating the desired performance in the violin education courses, overcoming technical difficulties, increasing command over the instrument and performing musical elements correctly require a systematic and conscious work.

As in all areas of education, in violin education, it is a necessary to use a number of methods and techniques to reach the knowledge and skills to be attained. There are many difficulties in violin education due to bow techniques, positions and passings, intonation, right and left hand technique. In addition to the difficulties caused by the instrument, the problems resulting from the students not knowing the effective practice methods and learning strategies have increased and affected student achievement.

In areas on how students should study so that they will succeed and learn easier, the concept of learning how to learn, which is considered

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effective learning, comes to the forefront. Nowadays, learning how to learn refers to individuals being aware of how they learn, having skills to monitor their own learning, knowing their own learning characteristics, and knowing, choosing and using the strategies that will be useful for them (Yıldızlar, 2012). Bringing up individuals who produce and use information is possible by them learning how to learn. Learning how to learn involves knowing and using learning strategies (Tay, 2007). Learning how to learn aims for individuals developing their own learning strategies, becoming aware of the strategies they use and controlling their own learning. Determining which learning strategies students use and identifying the relationship between learning strategies and academic achievement is important in reaching the targeted objectives at every educational (Şahin & Uyar, 2013). Demonstrating the desired performance depends on knowing effective learning efficacies and having the skills to use learning strategies. Learning strategies facilitate the individual learning of the student. A student can plan his or her own learning and use this plan by implementing learning strategies. In this regard, students need to learn learning strategies (Özer, 2002).

In order to ensure student development, Hüseyinova (2014) argued that an effective violin instructor should know individuals' developmental characteristics and know about teaching strategies, methods and techniques. In addition to having knowledge about methods, Fayeze (2001) asserted that a good violin teacher should be able to effectively analyze his or her students' perception styles and learning manners and should be able to effectively use learning strategies.

In this sense, the violin instructor teaching skills to his or her students on how to use learning strategies, and creating solutions to overcome the difficulties, and technical and musical hardships they may encounter during the violin education courses is vital. Graduate studies in music education in Turkey show that there is limited number of studies conducted on learning strategies (Akin, 2007; Demirova, 2008; Ertem, 2003; Kayhan Bircan, 2018; Kılınçer, 2013; Kocabaş, 1995; Kocaarslan 2016; Kurtuldu, 2007; Özer, 2010; Yokuş, 2009).

There is only one study on violin students' use of learning strategies in fine arts high schools. Elaboration dimension of the learning strategies was examined in this study (Akin, 2007). Starting from this, a study addressing all the dimensions of learning strategies in learning works during violin education courses and in acquiring technical knowledge and skills was needed. This constituted the basic point in shaping this study.

In this study, *Attention Strategies* from Gagné and Driscoll's (1988) learning strategies classification, and *Rehearsal*, *Elaboration*,

Organization, Comprehension Monitoring and Affective Strategies from Weinstein and Mayer's (1983, 1986) learning strategies classification were used.

Attention Strategies

The most important control process in the transition of information from sensory recording to short-term memory is attention (Öztürk, 1999). Attention refers to cognitive power or thought being concentrated on a subject or stimulus for a certain period of time (Demirova, 2008).

In case students have note errors while playing a piece, these parts should be marked with a pen and finger numbers should be written to easily play some of the passages (Fenmen, 1991).

Rehearsal Strategies

Rehearsal strategies include processes such as repeating certain expressions in the text or narration, identifying subject sentences from a written text, combining a verbal or candid sentence with another sentence (Sünbül, 1998).

Playing the study or piece practiced at a slow pace, playing according to different bow techniques and shapes, repeating by focusing on the difficult sections or passages, mentally repeating the newly learned information, and repeating the study or piece practiced until it is played with the correct technique and intonation are some examples to the use of repetition strategies.

Elaboration Strategies

During the learning process, the important point in terms of processing information is the way the new information is associated with, connected with and added to the old information. That is, information is not always effectively associated. Meaningful coding is to use information effectively in many different situations by bringing it back from long-term memory (Tay, 2004).

Establishing similarity and difference relationships between the rhythmic structures in the study or the piece and the rhythmic structures in the previously learned studies and pieces, establishing similarity and difference relationship between the newly learned bow technique and the bow techniques learned before, determining the position changing techniques (with the same finger, with different finger and empty string passing), establishing technical and musical connections between the previously studied pieces and the new pieces, studies and similar works, and using the acquired knowledge and skills on the new piece being practiced are some examples to the use of elaboration strategies.

Organization Strategies

Organization strategies refer to students organizing the newly acquired information by gathering it together in the light of the information they learned before. The classification of information and its representation with graphics and charts are tactics of this strategy (Selçuk, 2008).

Grouping the rhythmic patterns in the study or piece according to their similarities and differences, grouping the bow techniques learned in the study or piece according to their similarities and differences, grouping the studies or pieces according to their tone/theme, and classifying the technical information learned on the violin are some examples to the use of organization strategies.

Comprehension Monitoring Strategies

Comprehension monitoring involves students setting learning goals for any learning activity, assessing how well they reached these goals, and determining the strategies that they will use to reach these goals if necessary (Weinstein, 1988). According to Demirel (1993), comprehension monitoring refers to the knowledge students have about their own cognitive processes, as well as their ability to control these processes.

Determining the causes of difficulties encountered in the study or piece (for example, not being able to play clean sound, bow technique, changing position, changing string), distinguishing the difficulty level of a new piece, noticing the mistakes made while practicing, controlling and correcting the sounds while practicing, thinking and trying different practice methods to play better and accurate, planning the practice time, assessing the learning process, checking practices, asking the teacher questions in order to play better, listening to the professional record of the study or piece practiced, and assessing own performance are some examples to the use of comprehension monitoring strategies.

Affective Strategies

Affective strategies refer to strategies that help eliminate motivational and emotional obstacles in learning (Senemoğlu, 2005).

Enjoying playing violin for a long time, not having anxiety over grades or exam during violin practices, not feeling hopeless when there is a part in the piece that he or she cannot play or has a difficulty playing, never giving up until playing the violin beautifully and correctly, and feeling happy while playing violin are some examples to the use of affective strategies. The study problem is determined as follows.

Study Problem

What is the effect of the activities designed with learning strategies on students' use of learning strategies in violin education?

Study Sub-problems

1. What is experiment and control group students' level of using learning strategies in violin education courses?
2. Do the activities designed with learning strategies have an effect on experiment group students'?
 1. use of attention strategies?
 2. use of rehearsal strategies?
 3. use of elaboration strategies?
 4. use of organization strategies?
 5. use of comprehension monitoring strategies?
 6. use of affective strategies?

Purpose

The purpose of this study is to determine fine arts high school music department students' level of using learning strategies in violin education courses and to examine the effect of violin education courses conducted via activities designed with learning strategies on students' use of learning strategies.

Significance

This study is significant for various reasons. Covering all the dimensions of learning strategies, this study employed the true experimental design. It will be a source for future studies conducted in this area. The study results will contribute to the literature in terms of conducting violin education courses and structuring of these courses.

METHOD

Study Design

The study employed the *pretest-posttest control group random design*, one of the true experimental designs (Büyüköztürk et al., 2009; Büyüköztürk, 2001).

In the study, 12 students in the study group were divided into two groups of six people. Since the assignment of the students to the groups was done randomly, the study design is a *true experimental design*. The symbolic representation of the design is given in Figure 1 (Büyüköztürk et al., 2009).

R	Group E (Experiment)	Pretest O ₁	Treatment X	Posttest O ₃
R	C (Control)	O ₂		O ₄

Figure 1. Pretest-Posttest Control Group Random Design

Study Universe and Sample

While the study universe consisted of violin students studying in the music department of Kırşehir Neşet Ertaş Fine Arts High School, the study sample consisted of 12 11th grade violin students studying in the same school.

Table 1: Demographic Characteristics of the Students in the Study Sample

Sex	N
Female	6
Male	6
Total	12

Determining the Equivalence of the Study Groups

The study was carried out with two groups, an experiment and a control group. In order to analyze the equivalence of the student groups in the study sample, Mann Whitney U-Test was performed on the Violin Education Learning Strategies Scale pretest scores.

Table 2: Mann Whitney U-Test Results of the Violin Education Learning Strategies Scale Pretest.

Group	N	Mean Rank	Sum of Ranks	U	p
Experiment	6	7,67	46,00	11,00	0,261
Control	6	5,33	32,00		

According to the results in Table 2, the students in the experiment and control groups do not show a significant difference in terms of Violin Education Learning Strategies Scale pretest scores ($U = 11,00, p > 0,05$). This indicates that the experiment and control group students' use of learning strategies was equal.

Data Collection Tools

In the study, Violin Education Learning Strategies Scale, and activities and worksheets designed with learning strategies were used as data collection tools.

Violin Education Learning Strategies Scale

The Violin Education Learning Strategies Scale developed for this study consisted of 67 items and six factors after the reliability analysis. 5-point Likert type scale is rated as “Always (5)”, “Often (4)”, “Sometimes (3)”, “Rarely (2)”, “None (1)”. The Cronbach Alpha reliability coefficient of the scale was found as 0,966.

The materials developed for use in activities carried out during the experimental process:

1. Experiment group lesson plan designed with learning strategies
2. Control group lesson plan
3. Experiment group worksheet
4. Control group worksheet

Experiment Group Lesson Plan Designed with Learning Strategies

Lesson plans on the determined topics developed for the experiment group were designed with learning strategies. Practices on the dimensions of learning strategies to be used in the activities in the lesson plans are included. The topics addressed in the activities and application examples were determined by taking students' levels into account in line with expert opinions.

Control Group Lesson Plan

Practices towards the use of learning strategies were not used in the control group lesson plan.

Experiment Group Worksheet Designed with Learning Strategies

The worksheets were distributed to the experiment group students before each practice. The exercises on the worksheet were carried out step by step under the guidance of the teacher with the active participation of each student. For example, while the Staccato (playing each note sharply detached on violin) technique is being taught, students practice (such as underlining, circling) on the information explaining the technique on the worksheets (Attention strategy).

Application examples carried out for all dimensions of learning strategies are as follows:

On the topic of playing permanent scale and study on the 3rd position, grouping on the table on what sounds the fingers play on each wire on the 3rd position (Organization strategy).

Asking students to evaluate their own performance at the end of the activity (Comprehension Monitoring Strategy)

Saying to the students, “*Children, you all can play this practice correctly and beautifully. I trust you. You should also trust yourself.*” (Affective strategy)

Identifying the similar and different aspects of Staccato and martele bow techniques (Elaboration strategy)

Repeating a difficult section on the practiced study until the student plays correctly and cleanly (Rehearsal strategy).

The number of activities for each topic is equal in the worksheets developed for the experiment and control groups. In addition, it was paid attention to have the same and equal number of questions in measurement and test situations.

Control Group Worksheet

Learning strategies that were used to teach the determined subjects in the experiment group were not included in the worksheets developed for the control group students. The worksheets prepared were distributed to the students before the practice. The teaching process of the topic was carried out from the worksheets. The topics were covered using explanation, question answer, practice, induction methods and techniques.

Data Analysis

Quantitative data obtained by the data collection tools were transferred to SPSS 15.0 package program. Büyüköztürk (2003) stated that in cases where the sample size is as small as $n=6$ and the structure of the universe is not totally known, non-parametric tests must be used. Whether the data showed normal distribution or not was analyzed with Kolmogorov-Smirnov test. The results are shown in Table 3.

Table 3: Kolmogorov-Smirnov Test Results

Data	Statistic	df	p
Experiment pretest	0,306	6	0,047
Experiment posttest	0,195	6	0,001
Control pretest	0,224	6	0,034

Control posttest	0,191	6	0,002
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According to Table 3, Kolmogorov-Smirnov test results of the experiment and control groups' Violin Education Learning Strategies Scale pretest and posttest data did not show normal distribution since they were $p < 0,05$. During data analysis, Wilcoxon Signed-Ranks Test was used for the relational measurements and Mann Whitney U-Test for unrelational measurements, both of which are non-parametric tests.

FINDINGS AND INTERPRETATIONS

Findings and Interpretations on Experiment and Control Group Students' Use of Learning Strategies in Violin Education Courses

The Violin Education Learning Strategies Scale was administered to the students in the study group. The data obtained from the scale were interpreted with descriptive analysis.

For the interpretation of the table;

Range width of the scale $a = \text{range width} / \text{to number of groups}$, calculated by formula (Tekin, 1993) range width $a = [(5-1) / 5] = 0.8$ found as, on the scale created accordingly; options and limits are given in table 4.

Table 4: Range Width of The Scale, Alternatives and Limit Values

Width	Alternatives	Limit
5	Always	4,21-5,00
4	Often	3,41-4,20
3	Sometimes	2,61-3,40
2	Rarely	1,81-2,60
1	Never	1,00-1,80

The experiment and control group students' pretest and posttest mean scores of The Violin Education Learning Strategies Scale sub-factors are shown in Table 5.

Table 5: The Experiment and Control Group Students' Pretest and Posttest Mean Scores of the Violin Education Learning Strategies Scale Sub-Factors

Strategies	N	Experiment Group		N	Control Group	
		Pretest \bar{x}	Posttest \bar{x}		Pretest \bar{x}	Posttest \bar{x}
Attention Strategies	6	1,56 (Never)	4,06 (Often)	6	2,15 (Rarely)	2,24 (Rarely)
Rehearsal Strategies	6	3,13 (Sometimes)	4,27 (Always)	6	2,98 (Sometimes)	3,01 (Sometimes)
Elaboration Strategies	6	2,56 (Rarely)	3,93 (Often)	6	2,43 (Rarely)	2,39 (Rarely)
Organization Strategies	6	2,53 (Rarely)	3,67 (Often)	6	2,07 (Rarely)	2,09 (Rarely)
Comprehension Monitoring Strategies	6	3,27 (Sometimes)	4,24 (Always)	6	2,93 (Sometimes)	2,97 (Sometimes)
Affective Strategies	6	2,56 (Rarely)	3,66 (Often)	6	2,53 (Rarely)	2,59 (Rarely)
General Mean		2,60 (Rarely)	3,97 (Often)		2,51 (Rarely)	2,54 (Rarely)

According to Table 5, taking experiment group students' learning strategies general mean values into consideration, the pretest score means of the experiment group students was 2,60 and they "rarely" used learning strategies according to scale's limit values. The students' posttest general mean was 3,97 and they "often" used learning strategies. Therefore, the pretest mean scores ($\bar{x}=2,60$) showed a significant increase compared to the posttest ($\bar{x}=3,97$).

Taking control group students' learning strategies general mean values into consideration, the pretest score means of the control group students was 2,51 and they "rarely" used the learning strategies according to scale's limit values. The students' posttest general mean was 2,54 and they "rarely" used the learning strategies. These findings indicate that violin education conducted based on learning strategies in the experimental process increased the experiment group students' use of learning strategies,

whereas violin education in the control group did not affect the control group students' use of learning strategies.

Experiment and control group students' pretest and posttest mean scores are shown in Figure 2.

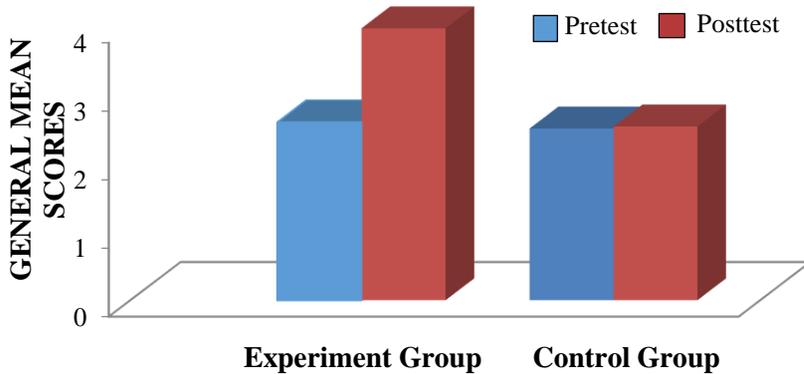


Figure 2. Experiment and Control Group Students' Pretest and Posttest Mean Scores

Findings and Interpretations on the Effect of Activities Designed with Learning Strategies on Experiment Group Students' Use of Learning Strategies

Table 6: Wilcoxon Signed-Ranks Test Results of the Violin Education Learning Strategies Scale Mean Scores

Posttest Pretest	N	Means Rank	Sum of Ranks	z	p
Negative Rank	0	0,00	0,00	2,201*	0,028
Positive Rank	6	3,50	21,00		
Ties	0	-	-		

*Based on negative ranks

According to the Wilcoxon signed-rank test, there is a significant difference between experiment group students' pretest and posttest mean scores of the Violin Education Learning Strategies Scale ($z=2,201$, $p<0,05$).

Findings and Interpretations on the Effect of Activities Designed with Learning Strategies on Experiment Group Students' use of Attention Strategies

Table 7: Wilcoxon Signed-Ranks Test Results of the Attention Strategies Mean Scores

Posttest Pretest	N	Means Rank	Sum of Ranks	z	p
Negative Rank	0	0,00	0,00	2,201*	0,028
Positive Rank	6	3,50	21,00		
Ties	0	-	-		

*Based on negative ranks

According to the Wilcoxon signed-rank test, there is a significant difference between experiment group students' mean scores of their use of attention strategies ($z=2,201$, $p<0,05$).

Findings and Interpretations on the Effect of Activities Designed with Learning Strategies on Experiment Group Students' Use of Rehearsal Strategies

Table 8: Wilcoxon Signed-Ranks Test Results of the Rehearsal Strategies Mean Scores

Posttest Pretest	N	Means Rank	Sum of Ranks	z	p
Negative Rank	1	1,00	1,00	1,997*	0,046
Positive Rank	5	4,00	20,00		
Ties	0	-	-		

*Based on negative ranks

According to the Wilcoxon signed-rank test, there is a significant difference between experiment group students' mean scores of their use of rehearsal strategies ($z=1,997$, $p<0,05$).

Findings and Interpretations on the Effect of Activities Designed with Learning Strategies on Experiment Group Students' use of Elaboration Strategies

Table 9: Wilcoxon Signed-Ranks Test Results of the Elaboration Strategies Mean Scores

Posttest Pretest	N	Means Rank	Sum of Ranks	z	p
Negative Rank	0	0,00	0,00	2,214*	0,027
Positive Rank	6	3,50	21,00		
Ties	0	-	-		

*Based on negative ranks

According to the Wilcoxon signed-rank test, there is a significant difference between experiment group students' mean scores of their use of elaboration strategies ($z=2,214$, $p<0,05$).

Findings and Interpretations on the Effect of Activities Designed with Learning Strategies on Experiment Group Students' use of Organization Strategies

Table 10: Wilcoxon Signed-Ranks Test Results of the Organization Strategies Mean Scores

Posttest Pretest	N	Means Rank	Sum of Ranks	z	p
Negative Rank	1	1,00	1,00	1,992*	0,046
Positive Rank	5	4,00	20,00		
Ties	0	-	-		

*Based on negative ranks

According to the Wilcoxon signed-rank test, there is a significant difference between experiment group students' mean scores of their use of organization strategies ($z=1,992$, $p<0,05$).

Findings and Interpretations on the Effect of Activities Designed with Learning Strategies on Experiment Group Students' use of Comprehension Monitoring Strategies

Table 11: Wilcoxon Signed-Ranks Test Results of the Comprehension Monitoring Strategies Mean Scores

Posttest Pretest	N	Means Rank	Sum of Ranks	z	p
Negative Rank	0	0,00	0,00	2,201*	0,028
Positive Rank	6	3,50	21,00		
Ties	0	-	-		

*Based on negative ranks

According to the Wilcoxon signed-rank test, there is a significant difference between experiment group students' mean scores of their use of comprehension monitoring strategies ($z=2,201$, $p<0,05$).

Findings and Interpretations on the Effect of Activities Designed with Learning Strategies on Experiment Group Students' use of Affective Strategies

Table 12: Wilcoxon Signed-Ranks Test Results of the Affective Strategies Mean Scores

Posttest Pretest	N	Means Rank	Sum of Ranks	z	p
Negative Rank	0	0,00	0,00	2,070*	0,038
Positive Rank	5	3,00	15,00		
Ties	1	-	-		

*Based on negative ranks

According to the Wilcoxon signed-rank test, there is a significant difference between experiment group students' mean scores of their use of affective strategies ($z=2,070$, $p<0,05$).

Based on these findings, violin education carried out with activities designed with learning strategies increased experiment group students' use of learning strategies in all dimensions of learning strategies.

CONCLUSION, DISCUSSION AND RECOMMENDATIONS

The study results revealed that the pretest general mean of the experiment group students was 2,60 and they "rarely" used learning strategies, whereas their posttest general mean was 3,97 and they "often" used learning strategies. Activities designed with learning strategies increased experiment group students' use of learning strategies in all dimensions of learning strategies. From this point of view, it can be said that the experimental process that was planned and programmed in detail significantly increased students' strategy use. The experiment group students "never" used attention strategies according to the pretest scores, whereas they "often" used attention strategies according to the posttest scores. Compared to other dimensions of learning strategies, attention strategies developed a significant awareness among students. Kurtuldu (2012) stated that being careful during the process of deciphering and reinforcing piece and study will eliminate mistakes and the extra time to correct mistakes.

The experiment group students “sometimes” used rehearsal strategies according to the pretest scores, whereas they “always” used rehearsal strategies according to the posttest scores.

While the experiment group students “rarely” used elaboration strategies according to the pretest scores, they “often” used elaboration strategies according to the posttest scores. In his study with middle school students, Güven (2004) stated that students use elaboration and comprehension monitoring strategies intensively. Akin (2007) argued that elaboration strategies are a useful and beneficial strategy for violin students in fine arts high schools. As a result of his experimental study, Özer (2010) revealed that elaboration strategies increases 10th grade students achievement in piano and positively affected their attitudes towards the piano course.

The experiment group students “rarely” used organization strategies according to the pretest scores, whereas they “often” used organization strategies according to the posttest scores. Ertem (2003) determined that students used organization strategies more based on their opinions. Ertem (2003) also stated that organization strategies positively and significantly affected and improved piano learning at the basic stage of piano education.

While the experiment group students “sometimes” used comprehension monitoring strategies according to the pretest scores, they “always” used elaboration strategies according to the posttest scores. Şimşek and Balaban (2010) expressed that students prefer to use comprehension monitoring the most. In his study conducted with music students, Nielsen (2008) put forth that students were more likely to use their comprehension monitoring (metacognitive) strategies than other strategies. Kılınçer (2013) determined that musicians who were successful on their instrument used comprehension monitoring strategies at a higher level than the musicians who just started playing.

The experiment group students “rarely” used affective strategies according to the pretest scores, whereas they “often” used affective strategies according to the posttest scores. McWhaw and Abrami (2001) confirmed that students with high levels of interest for a learning area use more strategies than those with low levels of interest. This led to the conclusion that students have more control over their learning strategies.

Güven (2004) revealed that middle school students use less rehearsal, affective and organization strategies. The study results of Özdemir (2004) put forth that high school students mostly use elaboration and comprehension monitoring. This is followed by affective and rehearsal strategies, and organization strategies came the last. In his study, Çelik

(2016) determined that 11th grade students used comprehension monitoring and elaboration strategies intensively, and the affective, rehearsal and organization strategies to a lesser extent.

The study results put forth that the pretest general mean of the control group students was 2,51 and they “rarely” used learning strategies, whereas their posttest general mean was 2,54 and they “often” used learning strategies. This may be explained by not using the experiment group activities designed with learning strategies with the control group students.

There was a significant difference between the experiment group students’ pretest and posttest mean scores of the Violin Education Learning Strategies Scale. According to this, conducting the violin course using activities designed with learning strategies had a significant effect on the experiment group students’ use of learning strategies.

There was a significant difference between experiment group students’ mean scores of their use of attention strategies. Activities designed with learning strategies showed a significant effect on experiment group students’ use of attention strategies. Kurtuldu (2012) stated that using warning markings in piano education is an effective practice in gathering students’ attention to some important points.

There was a significant difference between experiment group students’ mean scores of their use of rehearsal strategies. Activities designed with learning strategies showed a significant effect on experiment group students’ use of rehearsal strategies.

There was a significant difference between experiment group students’ mean scores of their use of elaboration strategies. Activities designed with learning strategies showed a significant effect on experiment group students’ use of elaboration strategies.

There was a significant difference between experiment group students’ mean scores of their use of organization strategies. Activities designed with learning strategies showed a significant effect on experiment group students’ use of organization strategies. In her experimental study, Sünbül (1998) determined that students in the group in which different learning strategies were applied showed the highest achievement in their elaboration and organization strategies.

There was a significant difference between experiment group students’ mean scores of their use of comprehension monitoring strategies. Activities designed with learning strategies showed a significant effect on experiment group students’ use of comprehension monitoring strategies.

There was a significant difference between experiment group students' mean scores of their use of affective strategies. Activities designed with learning strategies showed a significant effect on experiment group students' use of affective strategies. Doğan (2017) determined that a decrease in musical performance anxiety increased achievement.

Based on the study results, the following suggestions were made.

Recommendations

It can be expected that students' achievement in the violin course will be positive affected since learning activities designed with learning strategies enables students to use their learning strategies more effectively. At this point, it can be recommended to develop the violin education textbooks with learning strategies. In violin education courses, learning strategies can be taught explicitly by violin educators so that students can use these strategies effectively. In this way, students can gain strategic practice awareness such as planning, questioning, controlling and assessing their performance. By looking at the results of this experimental study, conducting future studies that will employ action research design can be suggested. Within the framework of the study results, learning strategies can be taken into account in program development processes. Using the Violin Education Learning Strategies Scale developed for this study, studies with broad participation can be conducted to examine the relationship between fine arts high school music department students' use of learning strategies and different demographic variables. Based on the Violin Education Learning Strategies Scale, learning strategies scales can also be developed for other string instruments (viola, cello). The effects of violin education based on learning strategies on affective factors influencing learning can be examined.

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CREATING POSITIVE SCHOOLS WHERE REFUGEES AND LOCAL STUDENTS GROW TOGETHER

Zeynep Cihangir Çankaya & Yelda Kağnıcı***

Millions of Syrians have come to Turkey after the war occurred in 2011 and the break-building efforts have been in their lives over the years. The number of Syrians in the April 2020 residing in Turkey is 3583384 people (Immigration Administration General Directorate, 2020) and 1 million 657 thousand (46.61%) are children aged 0-18 years (Refugee Association, 2020). As of 2019, the number of children enrolled in the school is around 680 thousand (UNICEF, 2020).

During this nine-year period, problems faced by Syrians and the attitude of the local people towards the refugees have been one of the most emphasized research topics. In the studies carried out with children, the problems that refugee children experience in schools and the attitudes of the local students, the teachers and psychological counselors towards Syrian students were among the most researched topics. When these studies conducted with children are examined, the language problem (Ağcadağ Çelik, 2019; Erdem, 2017), problems with peers (Eren, 2019; Kiremit, Akpınar & Tüfekci Akcan, 2018; Kuzu Jafari, Tonga & Kışla), 2018; Şimşir & Dilmaç, 2018) adjustment problems (Başar, Akan & Çiftçi, 2018; Levent & Çayak, 2017) and tendency to violence (Akay, Hamamcı & Kurt, 2018; Sarıtaş, Şahin & Çatalbaş, 2016; Şimşir & Dilmaç, 2018) were found to be the more common problems. The findings of the studies regarding attitudes towards Syrian students indicated that the attitude is negative among students, teachers and administrators (Emin, 2016; Kara, Yiğit & Ağırman, 2016; Mercan & Tüm, 2016; Sakız, 2016; Topkaya & Akdağ, 2016).

When these studies are analyzed as a whole, it is seen that one of the most basic suggestions for the solution of existing problems is to carry out systematic studies for adaptation in schools. Schools are one of the environments in which refugee children face their peers directly (Kopala, Esquivel & Baptiste, 1994) and in this context, schools serve as a bridge for refugee children to connect with society (Rousseau & Guzder, 2008).

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Refugee students consider schools as their “second family” and education, which is the most important factor contributing to their future success, also plays an important role in maintaining hope (Suarez-Orozco & Suarez-Orozco, 2001, cited in Kia-Keating & Ellis, 2007). While exposure to discrimination negatively affects mental health, self-confidence and causes depression and anxiety (Çelebi, Verkuyten & Bağcı, 2017; Pascoe & Richman, 2009; Smith & Silva, 2011), especially positive relationships with peers contribute to the self-values and social cohesion of refugee children. Positive experiences at school, such as trust constitutes an important place in the adaptation process (Fazel, Reed, Panter-Bricks & Stein, 2012). In this context, it is seen that many school-based programs have been developed especially for the adaptation of refugee students abroad (Etc: Esquivel & Keitel, 1990; Fazel, Doll & Stein, 2009; Greenberg, Garrison, Roy & Azar, 1999). Considering the problems faced by refugees' access to healthcare institutions or mental health professionals, it is inevitable that schools are one of the easiest accessible institutions for providing mental health services (Mohamed & Thomas, 2017).

When the literature is analyzed, it is seen that both the research and intervention programs focus on the problems such as trauma experiences, adaptation problems, perceived discriminatory attitudes, and the prejudices refugee students are exposed to. The cultural adaptation process is a challenging process and is stressful. In this process, the attitude of the host country is very critical as well as the personal factors specific to the individuals who have migration experience (Berry, 1997). However, even if it is challenging, the adaptation process can evolve in a positive way with the introduction of variables such as coping methods, healthy cultural attitudes, and social support. Therefore, in order to facilitate the adaptation processes in refugee studies, there is a need for positive interventions that will enable individuals with migration experience to see more about their positive lives and personal aspects. Adopting a perspective based on positive psychology principles can encourage them to gain more positive perspectives on what can help their personal development, especially in children (Mohamed & Thomas, 2017). Such interventions will contribute to the positive attitude of the teachers, who have a very important place in the adaptation process of refugee children. As a matter of fact, as stated by Vezzali, Giovannini and Capozza (2012), the implicit racial or ethnic attitudes of teachers are the predictors of implicit racial or ethnic attitudes of their students. Therefore, positive attitudes of teachers towards refugee children will also have positive effects on local students. As it is known, having good temperament, positive self-perception, ability to react to new

situations and appropriate social support are protective factors for mental health of refugee children and young people (Demirbaş & Bekaroğlu, 2013). For these reasons, based on the importance of creating a positive school climate in order to enable refugees and local students to live peacefully together, this article first explains the basics of positive education and positive education programs, and then offers a sample positive education program that covers the whole school.

Positive Education And Positive Education Programs

Positive psychology focuses on strengthening rather than weaknesses and building competence rather than pathology (Seligman & Csikszentmihalyi, 2000). This perspective of positive psychology allows to develop positive qualities rather than correct weaknesses. Positive psychology has three main working areas: positive subjective experiences, positive character traits, and positive institutions (Clonan, Chafouleas, McDougal, & Riley-Tillman, 2004). One of the main assumptions of positive psychology is that the environment can strengthen individuals' strengths and the development of positive institutions by providing a preventive environment (Clonan et al. 2004). In this context, it is an important point how information obtained through positive psychology research can be used to increase the happiness of the groups in real environments and institutions (Sawyer, Miller-Lewis & Clark, 2007). The role of positive psychology as an institution in schools and therefore in education is to support and reward the talents and strengths of children and adolescents and create opportunities to experience and exhibit them every day (Chafouleas & Bray, 2004).

The basics of applying positive psychology in education are, "What can we do to make schools become institutions that children are happy with?" is the main question. Positive education involves education of happiness and traditional skills (Seligman, Ernst, Gillham, Reivich, & Linkins, 2009) and implementation of positive psychology studies in the educational environment is referred to positive education (Green, Oades & Robinson, 2011). This means that schools become positive institutions by developing positive characteristics and creating positive emotions (Kristjansson, 2012). Positive education aims to combine positive psychology principles with educational paradigms to promote optimal development in the school environment (Norrish, Williams, O'Connor & Robinson, 2013).

Schools are suitable environments to support the well-being of children and adolescents. It is observed that the studies are gathered in three different but interrelated areas as "learning-school-education", "happiness, life satisfaction," and "interventions towards strengths and positive

development" (Linley & Proctor, 2013). Positive psychology interventions carried out within the scope of positive education includes defining and developing strengths, increasing the sense of gratitude and visualizing the best possible self (Sheldon & Lyubomirsky, 2006).

It has been observed that the application of positive psychology in educational environments strengthens students' strengths, makes them more successful, provides positive development in school and a permanent change in student behavior (Clonan et al., 2004), and is significantly related to students' well-being, relationships and academic performance (Clonan et al., 2004). Positive education programs are one of the school-based well-being interventions that combine evidence-based positive psychology interventions with traditional academic curricula to improve well-being (Morrish, Rickard, & Chin, 2018). These programs are generally based on the PERMA (positive emotions, engagement, positive relationships, meaning, accomplishment) model (Seligman, 2011) which emphasizes positive functionality (Morrish et al., 2018). There are three main reasons for working towards increasing well-being in schools. The first one is to prove that positive education programs prevent depression in schools, another is to know that programs increase the happiness levels of young people, and the last one is the high level of well-being with learning. Increasing well-being brings along a better learning performance and creative thinking, and improving the well-being of children and adolescents in the school environment is one of the basic requirements for teaching them ways (Seligman et al., 2009).

The view that the increase in children's well-being levels is linked to the increase in learning levels is based on the broaden-and-build theory of positive emotions of pioneer researcher Fredrickson (1998, 2001) on positive emotions. According to this theory, experiencing positive emotions broadens individuals' repertoire of action and thought, enabling them to deal with situations from a more flexible perspective. Based on this basis, children can learn to be happy as well as reaching traditional and academic learning goals in schools where programs to increase well-being are implemented. There are various school practices for this purpose (Froh, Sefick & Emmons, 2008; Galloway & Reynolds, 2015; Gillham, Reivich & Jaycox, 2008; Seligman et al., 2009; Shoshani & Steinmetz, 2013; Waters, 2011; Williams, 2011). In Turkey, there is no positive education program that can be implemented in school especially for refugees local students to live together in peaceful environment. In a recent study (Uz Baş & Firat, 2017), it was concluded that positive education is necessary in schools and will increase students' well-being and academic success.

“Growing Together” Positive Education Program

The positive education program should be considered as an integral part of all education programs. Interventions to be made within the scope of positive education should aim to support the development of students in personal-social and educational areas and to reach all students at the teaching level. In the positive education program proposed within the scope of this study, it is aimed to exchange and develop all students together including refugee students. In this direction, it is recommended to carry out improved classroom and outside interventions to meet the needs of all students based on their developmental characteristics. Suggestions regarding the objectives, principles, competencies, content and evaluation processes of the program were discussed separately.

Aims of the Program

With the program, it is aimed to increase the happiness levels, coping skills, hopes, self-esteem and self-efficacy levels of all students in the school environment with structured interventions and programs. Main goals are to increase students' knowledge and skills on positive concepts, to realize and use their strengths, to support and to establish positive relationships. It should be aimed to strengthen students' knowledge and skills by experiencing them in general and to create a positive climate in the school environment in general. Thus, the acceptance and friendship relations that refugee students need will be enabled. The qualifications that can be gained to students through the program are listed below:

1. Experience positive emotions and transfer this to life
2. Recognizing and developing the strengths of character
3. Understanding others and building healthy relationships
4. Coping with stressful situations
5. Developing optimistic thoughts and hope
6. Developing a realistic self-awareness and a positive self-perception
7. Seeing himself and others as individuals who experience positive emotions, achieve success and are a meaningful part of social / natural life.
8. To be able to cope with personal problems by using their strengths and experiencing positive emotions

While these competencies contribute to facilitating the adaptation process of refugee students and increase their resilience, a decrease in

prejudices towards differences can be observed in the school as local students will increase their empathy skills and this indirectly leads to increased friendship between groups.

Program Elements and Processes

The main concepts included in this program proposal are positive emotions, character strengths and positive relationships. Positive emotions such as love, gratitude, and hope are included in the program proposal based on Fredrickson's theory of expand and build (1998, 2001), which is the core of positive psychology interventions and can be addressed within the context of character forces. The principles that are essential in the development process of the program and recommended to be considered during the implementation process are as follows:

1. The positive education program is an integral part of the school counseling and guidance program and school education programs.
2. The program is a program that includes preventive, continuous interventions that improve the well-being of children and young people, aiming to create a positive school climate.
3. The school is seen as an environment where children and young people are empowered and developed.
4. The students have the necessary inner power to change and regulate their behavior and can guide their own development.
5. Positive experiences in the school environment allow students to accept and control themselves, develop and establish a positive bond with the school.
6. Developing positive features such as hope, optimism and well-being in the school environment enables students to experience positive emotions and create a positive school climate.
7. Applications within the scope of the program are not for problems but for competencies and personal powers; it focuses on possibilities rather than risks.
8. The "evaluation dimension" of the program is one of the basic elements of the program.

In the positive education program, in order to nurture children's abilities and make life more satisfying, it is suggested that the experiences are handled in three levels in line with the relevant literature (Seligman and Csikszentmihalyi, 2000). *At the subjective level*, positive emotions are focused with various programs and interventions. These are the well-being, satisfaction and life satisfaction levels of the children; constructive thoughts (hope and optimism) about the future itself and the future; for the present time, living in the moment is joy and happiness. *At the individual*

level, it is suggested to address the strengths of the character such as courage, honesty, perseverance, forgiveness, interpersonal relationship skills with class guidance practices. *At the group or community level*, it is recommended to support all school-based projects with the development of features that will affect the school climate, such as responsibility, caring for others, courtesy, and tolerance, and enable children to live together in school. Thus, it is aimed to develop positive emotions, positive behaviors and positive thinking structure in students.

Positive education program proposal includes program based studies in two different dimensions:

1. Positive relationships program
 - 1.a. Emotional intelligence psychoeducation program
 - 1.b. Life skills psychoeducation program
2. Character Strengths Program
 - 2.a. Classroom-based positive interventions
 - 2.b. School-based positive interventions

In the process of the program, class / branch teachers are recommended to perform some of the classroom and school based studies. For this reason, positive psychology workshops for teachers should be conducted during the seminar period before schools are opened. In this context, it should be aimed that teachers acquire knowledge about the positive concepts in the program and experience them in a experiential way. During the implementation process, it is recommended that teachers are supported in the context of consultation services.

1.Positive Relationships Program.

The main goal of involving positive relationships in the positive education program is to encourage students to develop positive relationships with their friends, teachers, and families in order to create a positive school environment (Shoshani & Steinmetz, 2013). The fact that positive relationships are one of the main characteristics that distinguish happy individuals from others (Diener & Seligman, 2002) is one of the main reasons for supporting students to develop positive relationships. Adapting to the new environment and the new school can be challenging for refugee children. In this context, it is also important to increase resilience in refugee children. Defining resilience as the ability to adapt to stressful situations, Crawford, Wright and Masten (2005 act. Daud

Klinterberg & Rydelius, 2008) emphasize that a supportive social environment is one of three key variables in improving the resilience of children at risk. The supporting environment includes contact between refugee and local students. Students with different social identities and in contact begin to understand how each other feels and sees the world, and this increase in empathy and the ability to look from the other's perspective also reduces intergroup prejudices (Hewstone, 2009; Pettigrew, Tropp, Wagner, & Christ, 2011). This also contributes to reducing anxiety among groups (Turner & Cameron, 2016). Turner and Cameron (2016) state that it is possible to raise young people ready for inter-group friendship by developing interventions focused on developing students' skills of empathizing, recognizing and accepting differences, and developing a positive school environment. A recent study held in Turkey pointed out that students who became friends with different social identities begin to see each other through a top social identity "friendship". In the study, it was also underlined that students' social skills development will contribute positively to the better development of friendship relations by directly interacting together through psycho-education programs (Türk, Kaçmaz, Türknüklü & Tercan, 2018).

In this program proposal, it is recommended that students acquire skills within the context of positive relationships primarily through psychoeducation studies. In order for students to experience positive emotions and develop positive relationships with themselves and others, two separate psychoeducation program suggestions are proposed. Psychoeducation programs on emotional intelligence and life skills can be implemented in line with the developmental needs of students of children and young people. Some suggestions for the preparation and execution of psychoeducation programs are given:

1. Psychoeducation programs can be organized for children and young people at all levels of education starting from primary school by differentiating the applications that will achieve the stated goals.
2. Preparing psychoeducation programs in modules ensures that each module can be used in individual and group works, if needed.
3. When creating psychoeducation groups, the school's students and refugee students are in the same group, facilitating collaboration between students and adaptation processes of refugee students.
4. Each program can be prepared in the form of a booklet containing the relevant literature, the structure of the program, the implementation and evaluation process, to increase the effectiveness and standardization.

5. Measurement tools, forms for students' group work and self-evaluation can be used to evaluate programs. It is also recommended to use an informed consent form to inform parents and students about the program and get their approval.

1 (a). Emotional intelligence psychoeducation program aims to help children and young people to recognize their emotions, to express and control their emotions. It is recommended that the program consists of three modules, which are the module of understanding their own feelings, the module of expressing their feelings and the module of understanding the feelings of others, and about 10 sessions each lasting 40 minutes. Session 1 can be structured as meeting, speaking the goals of psychoeducation and creating group rules. Sessions 2 and 3 (module of self-awareness) should include practices for students to recognize emotions, realize the importance of emotions in daily life and see the emotions they often experience. 4-6th sessions (module of expressing emotions) should include practices for students to learn the ways of expressing their emotions, and to gain the ability to express emotions in verbal and nonverbal ways. 7-9th sessions (module for understanding others' feelings) should include practices to help students develop listening skills and empathize with others.

1 (b). The life skills psycho-education program aims to review the social relationships of children and young people, especially friend relationships, develop appropriate social behaviors and help them solve problems in their relationships. It is recommended that the program consists of two modules: friend relationships and social problem solving module, and approximately 10 sessions each lasting 40 minutes. Session 1 can be structured as meeting, speaking the goals of psychoeducation and creating group rules. 2-6th sessions (friend relations module) should include activities for students to recognize social relationship networks and acquire social behaviors that must be exhibited in order to establish and develop friendship relations. 7-9th sessions (social problem solving module) should include practices for students to realize their daily problems and develop their problem solving skills.

2. Character Strengths Program

Individuals' strengths have been one of the main research topics since the beginning of the field of positive psychology. Strengths are defined as a whole of positive properties that energize and are authentic (Seligman & Csikszentmihalyi, 2000). The character strengths are gathered under 6 main features and includes 24 character features. These are wisdom & knowledge (creativity, curiosity, love of learning, judgment, perspective);

courage (honesty, bravery, perseverance, zest); humanity (kindness, love, social intelligence); justice (fairness, leadership, teamwork), temperance (forgiveness, humility, prudence, self-regulation) and transcendence (appraisal of beauty&excellence, gratitude, hope, humor, spirituality) (Peterson & Seligman, 2004). The training of developing the strengths of the character is based on the basis that the strengths of the character are in every student, but the priority strengths of each student differ and that these features can be developed (Park, Peterson & Seligman, 2004). In the case of refugee students, recognizing and strengthening their strengths will be the basis for developing the confidence and hope they need. Attracting focus more on children's strengths, competencies and abilities has a critical role in increasing resilience (Brooks, 1994). At the same time, the students in the school knowing each other with their strengths will contribute to developing positive relationships with each other. As Shankland and Rosset (2017) stated, the use of strengths in the classroom will also increase positive relationships, which will support the creation of a positive classroom environment.

Determining the strengths of the character and which aspects of children and young people are strong in their efforts to develop them is one of the important factors in their well-being (Huebner, Gilman, Reschly & Hall, 2009; Kristjánsson, 2012) and strong learning-based teaching and learning approaches. It has been shown that it supports well-being levels (Seligman et al., 2009). Another study found that there was a positive relationship between students' use of their strengths and self-efficacy levels (Proctor, Maltby, & Linley, 2010). It is emphasized that the studies on strengths are beneficial for the students in developing good relations with their students as well as their benefits (Brownlee, Rawana & MacArthur, 2012). In general, it is aimed to increase well-being by identifying and sorting character strengths and performing activities in accordance with strong character characteristics (Peterson & Seligman, 2004). In order to achieve this goal, it is recommended to help students in determining their strengths first (Green & Norrish, 2013; Lippman, Moore & McIntosh, 2011). In the literature developing strengths studies include (a) determining strengths (Madden, Green & Grant, 2011), (b) determining goals for using and developing strengths (Green & Norrish, 2013) and (c) implementing (Rawana, Latimer, Whitley & Probizanski, 2009). Researchers also focus on the difference between recognizing their strengths and using their strengths and their effects on well-being (Seligman et al., 2005). In a study, it was found that using strengths on well-being was a strong predictor than knowing strengths (Waters, 2015). Based on these foundations, the program of developing the strengths of the

proposed character should focus on determining the internal resources of students with various tools and how students can use them in their lives.

Various ways can be used to determine students' strengths. For example, students can be given the definition of 24 strengths and asked to mark their own. They may be asked to ask their relatives' observations about their strengths. The student may be asked to remember a moment when a person speaks positive words to him, and what strength did he see? What did he said to you? How did your hear affect you?. Students may be asked what the situation / event they are most proud of in their lives. Students can be asked which skills they learn easily. The students are asked to observe themselves every day and set the clock to 30 minutes. In every alarm, he can be asked to ask the question "What is my strong point that I am using now?" students may be asked to write an experience that did something really good in their lives, perform better than ordinary, and then think about what happened, their roles, in that case. Past stories can give you insight into your strengths.

In the program of developing the strengths of the character, the studies are planned to include the participation of all teachers in order to develop the strengths of the students. Because in the related literature, it is recommended that students be supported by their teachers in different lessons in order to develop their strengths (Norrish et al., 2013). Suggested studies are as follows; Strengths of the character should be integrated into the school curriculum; b) Activities for strengths should be implemented in the lessons in which guidance and psychological counseling practices are carried out; (c) The first 15 minutes of the first lesson each morning should be devoted to work on character strengths, c) It should be experienced and developed with guidance studies (psychoeducation studies and individual interviews, small group works etc.); d) finally, students should be ensured to recognize, experience and develop their strengths through core projects. These proposed studies are explained under two titles as classroom based and school based interventions covering the whole school.

2(a). Classroom Based Positive Interventions

It is recommended to develop the strengths of students already existing, to develop new strengths and to help students identify strengths in other individuals. Scales (eg Peterson & Seligman, 2004; Ekşi, Demirci, Kaya & Ekşi, 2017; Kabakçı, 2013), portfolios, peers, teachers and parents observations can be used to determine students' strengths. It is emphasized that it is important for students to observe their peers, to give feedback to each other and to share strengths in order to gain awareness about students'

own strengths (Galloway & Reynolds, 2015). By applying the 360 ° activity (Strengths 360) that can be used for this purpose, students can be asked to identify 5 people and observe them for a certain period of time, note their strengths and then share them with that person (Shankland & Rosset, 2017).

Researches show that the characteristics of love, curiosity, gratitude, zest and hope are in a stronger relationship with life satisfaction (Park et al., 2004; Peterson, Ruch, Beerman, Park & Seligman, 2007). In a study conducted by Park and Peterson (2006) with children aged 10-17, it was found that hope, love, gratitude and zest showed a positive relationship with life satisfaction. In terms of main features, transcendence (appreciation of beauty, gratitude, hope, humor and spirituality) in the adolescent group was found to be the strongest variable predicting life satisfaction (Gillham et al., 2011; Shoshani & Slone, 2013). In another study, hope and love were found to be the strongest predictor of adolescents' life satisfaction (Blanca, Ferragut, Ortiz-Tallo & Bendayan, 2018). In a study conducted with young people in Turkey, love, zest, gratitude, perspective and forgiveness characteristics of subjective well-being were significantly predictive strength of character, and among these hope and zest were determined as forefront (Kabakçı, 2013). Having hope is one of the strategies to deal positively with the acculturation stress in refugees (Yakushko, 2010). Despair, on the other hand, is defined as one of the saddest factors for these children who have had a traumatic experience or are affected by war (Goodman, 2004; Terr, 1991; Walton et al., 1997). Studies show that hope is necessary for refugee children and adolescents to cope with their lives and distress (Goodman, 2004; Turner, 2005). As a matter of fact, a hope-based program conducted by Yohani and Larsen (2009) was found to be one of the important personal resources for refugee children in adapting to their new environment, hopefulness leads to safe relationships and increased resilience. For these reasons, while developing all strengths in the program of strengthening the strengths of the character, it is recommended to give more weight to the classroom and outside practices aimed at developing students' love, curiosity, gratitude, zest and hope . For example, in the first 15 minutes of classes to raise the level of hope of children, or as part of class guidance, students can be asked "Think about the bad things that happened to you and say a positive direction about all of them, draw what you hope for your future, picture hope in a cardboard with 3-4 friends. To set a goal students can be asked to "Tell us how to get you to your goal, how to overcome any obstacles and obstacles on each road, prepare an optimistic and pessimistic mask and talk like whatever mask you wear, find hopeful optimistic thoughts in case of a given problem." With the Signature Strengths in a New Way activity

(Seligman et al., 2005), they use one of the five most important character strengths that explain themselves to students, each day for a week / they may be asked to use it in a new way.

2 (b). School-Based Positive Interventions

One of the studies that can be carried out for the purposes of the positive education program may be school-based projects. School-based projects are designed to experience and develop these features, as it is emphasized that the application of well-being in schools is "live it, teach it, and involve it" (Norrish et al., 2013). As mentioned earlier, the studies show that the characteristics of love, curiosity, gratitude, life enthusiasm and hope are in a strong relationship with life satisfaction (Park et al., 2004; Park & Peterson, 2006; Peterson et al., 2007). Therefore, it is recommended to carry out school projects to realize and develop these features.

The aim of the projects should be that the students experience and develop the strength (love, curiosity, zest, gratitude, hope) that will be handled during that project month. In order for the projects to provide parallelism with the class activities, it is suggested to start in October and continue with a strong direction every month, continuing in love, curiosity, life enthusiasm, hope and gratitude. Throughout the month of the project, they will feel the strength and make others feel by expressing their feelings, showing their strengths to teachers and friends, strong direction themes, writing writings, poems, letters, works of art, speeches, research, interviewing, taking photos, posing, singing and dancing. The activities they can use can be planned. These activities can be carried out during breaks, before classes begin or after lessons. Conducting these works as a natural part of the school climate without turning into a formal ceremony is a very important point on the basis of the principle of "live it, teach it and embrace it". The project, which aims to develop the strength that is referred to as "love" in students, can be structured as follows:

Purpose of the Project: It is aimed that students recognize, experience and develop love as a strong aspect.

Project coordinator and partners: School administration and school psychological counselors organize the project, all teachers are partners of the project.

Month of the project: October

Project location: School corridors and classrooms

Participants: All students and school staff

Events:

1. A panel is arranged to hang the products that arise in the project.
2. In the first week, students are allowed to hang the words of "love" that come to their mind and make speeches expressing their love in front of the board.
3. In the second week, students are provided to write the positive features of their friends and / or teachers on paper and post them on the clipboard.
4. In the third week, students are provided to express their love in a creative way (such as poetry, vignette, photo of important moments, places of love, poses of love).
5. During the fourth week, students and teachers show their love for each other in the first five minutes of the first lesson each day. These moments are photographed and hung on the clipboard.

In summary, the program includes two psychoeducational programs that will enable students to experience positive emotions and develop positive relationships, classroom activities that will enable students to recognize and develop the strengths of their characters, and school projects to develop positive emotions, relationships and strengths of the character.

Program Evaluation

It is recommended that the program is structured and systematically evaluated. Evaluation can be carried out in three dimensions: evaluation of teachers and psychological counselors, evaluation of the program and evaluation of student competencies (Gysbers & Handerson, 2000). For this purpose, measurement tools, observation and interview forms can be used. In evaluating the program, it will be useful to refer to the opinions of parents, students and teachers. Determining the impact of the program on students can be done in the short, medium and long term. Short-term evaluation is done by means of "efficacy feedback forms" or appropriate measurement tools, tools developed based on qualifications at the end of each training program included in the medium-term evaluation program, assessment of qualifications related to qualifications, and assessment for long-term goals is completed at the end of the academic year. and academic achievement, life satisfaction, happiness, optimism etc. before and after the program with measurement tools, teacher, student, parent interviews and students. It can be accomplished by comparing the levels.

Recommendations

In this study, a program proposal was presented on how the results of positive psychology researches, which have increased in our country in recent years, can be applied in the school environment with a perspective that especially takes refugee students into consideration. In studies conducted abroad, it was observed that school-based positive psychology interventions were categorized in 4 dimensions as character powers, gratitude, positive relationships, and conscious awareness interventions (Shankland & Rosset, 2017). In the program proposal, positive relationships, character strengths and positive emotions are included, and conscious awareness interventions are not included. This dimension can also be included in positive education programs in practical studies. Programs based on program proposal can be developed, implemented and evaluated by researchers and practitioners.

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THE EFFECT OF READING COMPREHENSION AWARENESS OF FACULTY OF LETTERS STUDENTS ON SCIENCE LITERACY

Nuray Zan & Burcu Umut Zan***

Introduction

The Space Age began in 1957 when Russia launched the first artificial satellite, Sputnik 1 into Earth's orbit. It was a great move as it meant that Russia forged ahead in their long-term rivalry with the United States of America, and the USA responded with a long-run act by allocating a great amount of the budget on education after realizing the strategic importance of scientific knowledge. The core of that great move by the USA was the question: "What kind of a citizen profile must be created to be a strong country in the world?" In reply to that question, an increase in the number of science literates was noted to be necessary, and the term science literacy started to be used in the late 1950s (Hurd, 1958; Curdy, 1958). In line with those developments, new curricula were developed by relating sciences to life combining them with society and technology after science literacy became the common vision of science education in the USA (Solomon & Aikenhead, 1994; Aikenhead, 2003). Thereupon, science literacy became an indispensable part of science curricula (AAAS, 1993). In general terms, it is possible to describe science literacy as the ability to understand and explain scientific concepts and phenomena at elementary level, to follow technological developments and practice them in real life. Based upon this description, science literates are expected to obtain and use the information that they need in decision phases in a way that facilitates or gives a meaning to their lives by understanding the nature of science and scientific knowledge.

As well as the emphasis on scientific concepts, some behaviors that need to be basically developed in individuals are also underlined in definitions of science literacy. Ministry of National Education (2005) defines science and technology literacy as "the combination of skills, attitudes, values, understanding and knowledge related to science, which are necessary for individuals to develop skills of research and questioning, critical thinking, problem solving and making decisions, to be lifelong

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learners, and to maintain their interest in their environment and the world”. Similar definitions are also frequently encountered in some other studies (Kavak, Tufan, Demirelli, 2006; Aydođdu, 2006; Erdođan, 2007). According to this definition, it is possible for students to be science literates as long as they are raised as individuals who master in problem solving, investigate, make effective decisions, and, in general terms, learn to learn, and make it a part of their life. Another factor that affects students’ science literacy education is their reading comprehension, which is underlain by the ability to be a literate. In the Turkish Dictionary by Turkish Language Association, literate is defined as “a person who is able to read and write, who is educated”. In other words, literacy in general sense is expressed as pronouncing words, and giving meaning to phrases laid together while functional literacy, which is a higher level, is described as using knowledge and skills related to reading and writing in personal, social and cultural domains (Aşıcı, 2009). Not only science and technology literates but also functional literates are expected to read fast, comprehend and put what they read into practice when necessary. Reading and reading comprehension are defined as a part of the cognitive process created by student through examining information obtained from reading, categorizing in order, evaluating by correlation, and associating with prior knowledge if there is any (Güneş, 2009; Epçaçan, 2009; Yıldız, Akyol, 2011). Based on this definition, reading and reading comprehension are accepted as an important variable affecting students’ personal and academic development (Yıldız, Akyol, 2011); besides, reading comprehension level is considered to be influenced by individual’s willingness to comprehend, interest in the subject, judgments, and purpose of reading (Epçaçan, 2009). Reading comprehension skill, which is described as the first step of academic life, is known to have positive or negative effects on all lifelong learning processes of a student (Yılmaz, 2008). Bloom (1995: 60) revealed that there is a relationship between the competence of reading comprehension skill and students’ success in math, science, language and literature courses (as cited in Yılmaz, 2008). It is common knowledge that students generally exhibit negative attitude towards sciences from the beginning of their education life (Kavak, Tufan, Demirelli, 2006; Zan, 2008). When this knowledge is associated with reading comprehension skill and willingness, it is not surprising that the number of science literates is less than other types of literates. However, it is inevitable that every individual needs science education in today’s world. In this Information Age, people are expected to think and talk about scientific problems affecting their life qualities and to be engaged in an activity when necessary (Zan, 2008). Therefore, within the scope of science literacy, a person with basic science education should make inferences about global problems considering the developing technology (King, 2000). For example; a science literate is

capable of understanding main causes of global warming, effect of increased carbon dioxide emission on climate, threats of tobacco use to human health and realization of whether something is garbage or recyclable etc., and accordingly, he/she should adopt an appropriate way of life and take due precautions.

Students, in Turkish education system, select their fields as sciences or social sciences according to their future profession when they are at high school. In this direction, they develop a cognitive background, attitude, perception and values related to sciences beforehand; which affect their selection. Therefore, their interest in sciences or social sciences is determined in this period by which; however, every student has already had a science culture. The vision of 2005 Science and Technology Curriculum (revised in 2013 and 2018) is defined as “raise every student as a science literate” (MEB, 2005, 2013, 2018), so it is aimed for all students to adopt science literacy. From this point of view, a study was planned to examine science literacy skills of undergraduate social science students that the science curriculum by MEB intended to raise. In the study, it is aimed to investigate the effect of social science students’ reading comprehension awareness on their science literacy.

2.Method

2.1 Design of the Study

The study aims to investigate the effect of reading comprehension awareness on science literacy in senior students studying Geography, Philosophy, and Turkish Language and Literature in the Faculty of Letters at a developing university. First, in line with this purpose, students were requested to fill in the reading comprehension scale. Then, in the second step, they were given a text about daily events based on science literacy and addressed text-related questions. While choosing those questions to be asked, environment and health themes were selected considering the common topics of general knowledge. An analysis was carried out to identify the effects of reading comprehension awareness on science literacy in senior students studying Geography, Philosophy, and Turkish Language and Literature. Within the scope of the study, the results obtained from social science students’ answers to science questions were compared in regard to different fields. In the second step, the correlation between students’ point averages in science literacy and reading comprehension scale results was examined and evaluated based on departments.

2.2 The Purpose of the Study

The purpose of the study is to investigate the effect of reading comprehension awareness on science literacy in senior students studying Geography, Philosophy, and Turkish Language and Literature in the Faculty of Letters at a developing university. In the study, answers to the following questions were sought.

1. Is there a difference between the reading comprehension scale scores of the senior students studying Geography, Philosophy, and Turkish Language and Literature?
2. Is there a difference between the science literacy successes of the senior students studying Geography, Philosophy, and Turkish Language and Literature?
3. Is there a relationship between the reading comprehension scale results and the science literacy successes of the senior students studying Geography, Philosophy, and Turkish Language and Literature?

2.3 Data Collection

The data collection tool used in the first step of the study was the reading comprehension self-efficacy scale developed by Epçayan & Demirel (2011). The Cronbach's Alpha reliability coefficient of the scale was found to be 0,88. The scale consists of 27 items including themes of written and visual comprehension, self-regulation in reading, and high self-confidence related to reading. In order to find the levels of agreement with those themes, a 5-point Likert scale was used.

The participants responded to science-related questions in the second step of the study. During their preparation, PISA (Program for International Student Assessment) exam questions and sample questions in the exams published on the Ministry of National Education website (PISA, 2019) were utilized. They were reorganized based on language, and their content validity was checked by experts in their fields and found to be high. The questions to measure science literacy were subcategorized as scientific interpretation of data or evidence, explanation of scientific concepts, design and evaluation of scientific research, and scientific interpretation.

2.4 The Sample of the Study

Senior students (n=124) studying Geography, Philosophy, and Turkish Language and Literature in the Faculty of Letters constitutes the sample of the study.

2.5 Analysis of Data

Research data were coded and saved into SPSS 22 program. The findings were interpreted based on the significance level of 0,05.

3. Findings

For the purpose of investigating the effect of reading comprehension awareness on science literacy in senior students studying Geography, Philosophy, and Turkish Language and Literature in the Faculty of Letters, the study was conducted with 124 students. The findings obtained in the study are given below.

3.1 Demographic Findings

Under the title of demographic and personal findings; information on gender, department and high school (alma mater) was examined, and the related data were presented in Table 1.

Table 1: Descriptive data on variables of gender, department and high school

Descriptive statistics for gender		
	Frequency (n)	Percentage (%)
Female	98	79,0
Male	26	21,0
Total	124	100,0

Descriptive statistics for department		
	Frequency (n)	Percentage (%)
Turkish Language and Literature	38	30,6
Philosophy	32	25,8
Geography	54	43,5
Total	124	100,0

Descriptive statistics for high school		
	Frequency (n)	Percentage (%)
Anatolian High School	40	32,3
Anatolian Vocational High School	27	21,8

Religious High School (Anatolian/Regular)	11	8,8
Regular High School	42	33,9
Open Education High School	3	2,4
Anatolian Teacher High School	1	0,8
Total	124	100,0

The sample of the study comprises of 79% female and 21% male students who study Turkish Language and Literature (30,6%), Philosophy (25,8%), and Geography (43,5%). When it comes to the high school they graduated from, they vary from regular (33,9%) and Anatolian high schools (%32,9) to Anatolian/regular vocational high schools (21,8%).

3.2 Reading Comprehension Skills Based on Departments

In order to carry out statistical analysis, it is necessary first to research whether the test results show normal distribution or not; therefore, the data obtained were evaluated by using “one-sample Kolmogorow Smirnow test”. Since the significance value (Assymp. Sig.= p) was found to be less than 0,05 at the end of the evaluation, nonparametric test methods were used in the study.

In this part of the study, Kruskal-Wallis test, which is used to compare the data obtained from continuous variables for three or more groups, was performed. At the end of the analysis, significance levels of the groups were identified as higher than 0,05. As a result, no statistically significant differences were determined between reading comprehension self-efficacy levels of senior students studying Geography, Philosophy, and Turkish Language and Literature (TLL) in the Faculty of Letters. Kruskal Wallis test revealed that there was no statistically significant difference in the subcategories of the reading comprehension self-efficacy scale completed by the students from three different departments. Those subcategories were written and visual comprehension (WVC), self-regulation in reading (SRR) and high self-confidence related to reading (SCR). The data related to Kruskal- Wallis test was presented in Table 2.

Table 2: Reading comprehension skills according to departments

	WVC	SRR	SCR	
	Mean Rank	Mean Rank	Mean Rank	N
TLL	57,53	60,96	60,42	38
Philosophy	51,40	49,16	49,68	32
Geography	59,84	66,82	66,89	54
	WVC	SRR	SCR	
Chi-Square	1,257	5,160	4,893	
Df	2	2	2	
Asymp. Sig.	,533	,076	,087	

Kruskal-Wallis Test revealed that there were no statistically significant differences in WVC, SRR and SCR levels of the students in three different departments (TLL n=38, Philosophy n=32, Geography n=54). On the other hand, considering the mean ranks of the departments, Geography students have the highest self-efficacy in WVC, SRR and SCR.

3.3 Evaluation of Science Literacy Gain Scores Based on Departments

To find out if there was statistically significant difference between the students' science literacy successes or not, Kruskal-Wallis test used to compare the data from continuous variables for three or more groups was carried out. The data related to Kruskal-Wallis test in Table 3.

Table 3: Science literacy scores according to departments

Department	N	Mean Rank	Chi-Square	df	Asymp. Sig.
TLL	38	53,61	4,805	2	,091
Philosophy	32	60,47			
Geography	54	69,96			

The analysis results revealed that significance levels of the groups were higher than 0,05 ($p=,091$). Consequently, no statistically significant difference was determined in science literacy scores of the senior students

studying Geography, Philosophy, and Turkish Language and Literature in the Faculty of Letters.

3.4 Science Literacy Gain Scores Based on Departments

Student responses to the questions of science literacy were presented in Table 4. The questions to measure science literacy were subcategorized as scientific interpretation of data or evidence, explanation of scientific concepts, design and evaluation of scientific research, and scientific interpretation.

Table 4: Total scores of students according to their departments

Question 1: Scientific interpretation of data and evidence				
	TLL (%)	Philosophy (%)	Geography (%)	Total (%)
Invalid	7(% 18,4)	9(% 28,1)	2 (% 3,7)	18(% 15)
Partial score	10(% 26,3)	9(% 28,1)	8 (% 14,8)	27(% 22)
Valid	13(% 34,2)	8(% 25)	17(% 31,5)	38(% 31)
Full score	8(% 21,05)	6(% 18,75)	27(% 50)	41(% 33)
Total	38 (% 100)	32 (% 100)	54 (% 100)	124(% 100)
Question 2: Scientific interpretation of data or evidence				
	TLL (%)	Philosophy (%)	Geography (%)	Total (%)
Invalid	3(% 7,89)	7(% 21,87)	5 (% 9,26)	15(% 12,1)
Partial score	12(% 31,57)	9(% 28,12)	20(% 37,04)	41 (% 33)
Valid	15(% 39,47)	16(% 50)	17(% 31,48)	48(% 38,7)
Full score	8(% 21,05)	0(% 0)	12(% 22,22)	20(% 16,1)
Total	38 (% 100)	32 (% 100)	54 (% 100)	124(% 100)
Question 3: Explanation of scientific concepts				
	TLL (%)	Philosophy (%)	Geography (%)	Total (%)
Invalid	25(% 71,42)	11(% 34,37)	7(% 12,96)	43 (% 4,6)

Partial score	11(%28,94)	11(%34,37)	18(%33,33)	40(%32,2)
Valid	1(%2,63)	4 (%12,5)	19(%35,18)	24(%19,4)
Full score	1(%2,63)	6 %18,75)	10(%18,5)	17(%13,7)
Total	38(%100)	32(%100)	54(%100)	124(%100)

Question 4: Explanation of scientific concepts

	TLL (%)	Philosophy (%)	Geography (%)	Total (%)
True	20(%52,6)	9 (%28)	20(%37,03)	49 (%40)
False	18(%47,36)	23(%71,87)	34(%62,96)	75 (%60)
Total	38 (%100)	32 (%100)	54 (%100)	124 (%100)

Question 5: Scientific interpretation

	TLL (%)	Philosophy (%)	Geography (%)	Total (%)
Empty	0(%0)	0(%0)	0(%0)	0(%0)
Missing	4 (%10,52)	0(%0)	3(%5,55)	7(%6)
Valid	6 (%15,78)	9 (%28,13)	13(%24,07)	28 (%23)
Full	28(%73,68)	23(%71,87)	38(%70,37)	89 (%72)
Total	38 (%100)	32 (%100)	54 (%100)	124(%100)

Question 6: Design and evaluation of scientific research

	TLL (%)	Philosophy (%)	Geography (%)	Total (%)
False	24 (%63,1)	21(%65,62)	39 (%72,2)	84 (%68)
True	14(%36,84)	11(%34,37)	15 (%27,7)	40 (%32)
Total	38 (%100)	32 (%100)	54 (%100)	124 (%100)

Question 7: Scientific interpretation

	TLL (%)	Philosophy (%)	Geography (%)	Total (%)
Empty	1 (%2,63)	1 (%3,12)	3 (%5,55)	5 (%4,03)
Invalid	10(%26,31)	8 (%25)	15 (%27,7)	33(%26,61)

Missing	13(%34,21)	11(%34,37)	11(%20,37)	35(%28,22)
Valid	7 (%18,42)	8 (%25)	18(%33,33)	33(%26,61)
Full	2 (%5,26)	0 (%0)	4 (%7,40)	6 (%4,8)
Fully U.	5 (%13,16)	4 (%12,5)	3 (%5,55)	12 (%9,68)
Total	38 (%100)	32 (%100)	54 (%100)	124 (%100)

Questions 1, 2 and 3 are about global warming, and there are two explanatory graphs in the text. Questions 1 and 2 are based on scientific interpretation of data or evidence, and question 3 is on explanation of scientific concepts. The graphs in the text present carbon dioxide emission by years and average temperature rise in the Earth's atmosphere. Question 1 is required to be answered by interpreting the data presented with regard to the graph. On the whole, 18 students did not read the graph and respond to this question while 41 students gave a full answer by reading the graph. Other students' responses were considered as inadequate or missing. Of those who did not answer the question, 9 were Philosophy students, and of those who gave full answers, 27 were Geography students. When it is evaluated on the basis of department, those who answered the question correctly were 50% Geography, 21,05% Turkish Language and Literature and 18,75% Philosophy students.

In question 2, students were requested to find the factors affecting global warming in the text and present them with evidence. In general, 15 students could not find the related information in the text and answer the question while 20 students found all the factors affecting global warming and responded to the question completely. Other students' responses were considered inadequate or missing. Of those who did not answer the question, 7 were Philosophy students, and of those who gave full answers, 12 were Geography students. When it is evaluated on the basis of department, those who answered the question correctly were 22,2 % Geography and 21,05% Turkish Language and Literature. Philosophy students were not able to answer this question correctly.

In question 3, students were requested to judge different points related to the topic through the graph and explain the scientific concepts. Overall, 43 students could not make comparisons by reading graphs and answer the question, but 17 students could achieve it and responded. Other students' responses were considered inadequate or missing. Of those who did not answer the question, 25 were Turkish Language and Literature students, and of those who gave full answers, 10 were Geography students. When it is evaluated on the basis of department, those who got full points were

18,75% Philosophy, 18,5% Geography and 2,63% Turkish Language and Literature students.

Questions 4, 5, 6 and 7 are about health. Question 4 is asked within the context of scientific concept explanation, 5 and 7 are of scientific interpretation, and 6 is of scientific research design and evaluation. In question 4, students were expected to mention the factors having adverse effects on “lungs in the respiration system” and explain the function of the lung. 49 students answered this question incorrectly by giving misinformation about the function of the lung, but 75 students were able to explain the primary duty of the organ using scientific expressions and gave a full answer to the question. Those who gave wrong answers were 40 students evenly from Turkish Language and Literature (20) and Geography (20). Of those who answered correctly, 34 were Geography students. When it is evaluated on the basis of department, those who got full points were 71,87% Philosophy, 62,96% Geography and 47,36% Turkish Language and Literature students.

In question 5, students were requested to select adverse effects of tobacco on health and illnesses it causes among a set of statements. There was no student who did not answer this question. 89 students were able to select the statements in which the illnesses caused by tobacco given correctly and answered the question completely. Responses by other students were considered inadequate, missing or wrong. Of those who gave full answers, 38 were Geography students. When it is evaluated on the basis of department, those who got full points were 73,68% Turkish Language and Literature, 71,87% Philosophy and 70,37% Geography students.

In question 6, students were requested to order the steps of a scientific study related to tobacco use mentioned in the text. Overall, 84 students could not put the steps in correct order; however, 40 students were identified as competent enough to build an overview of scientific research by answering the question completely. Of those who responded incorrectly, 39 were Geography students. The question was answered correctly by students from each department at similar rates. When it is evaluated on the basis of department, those who got full points were 36,84% Turkish Language and Literature, 34,37% Philosophy and 27,7% Geography students.

In question 7, students were addressed the topics of science, technology, society and environment. On the whole, 5 students did not answer the question at all, and 33 students gave invalid answers by failing to link science, technology, society and environment; nonetheless, 12 students were able to establish the connection between the aforementioned topics

and gave complete answers to the question. Of those who did not answer, 3 were Geography students while of those who gave full responses, 5 were Turkish Language and Literature students. When it is evaluated on the basis of department, those who got full points were 13,16% Turkish Language and Literature, 12,5% Philosophy and 5,55% Geography students.

The responses given to the questions of science literacy were evaluated according to the scores and departments and presented in Graph 1. The maximum score of the 7-question analysis was calculated as 26. When the students' answers to the science literacy questions were analyzed, the highest score was found to be 22. The arithmetic means of the scores that 124 students gained from the 7 questions was identified as 14,21. As it can be seen in Graph 1, there was no student who could get 26 points by answering all the questions correctly. It stands out that those who got the highest scores with 21-22 were Geography students whereas those with the lowest scores with 5-8 were Turkish Language and Literature students. The related data are explicitly presented in Figure 1.

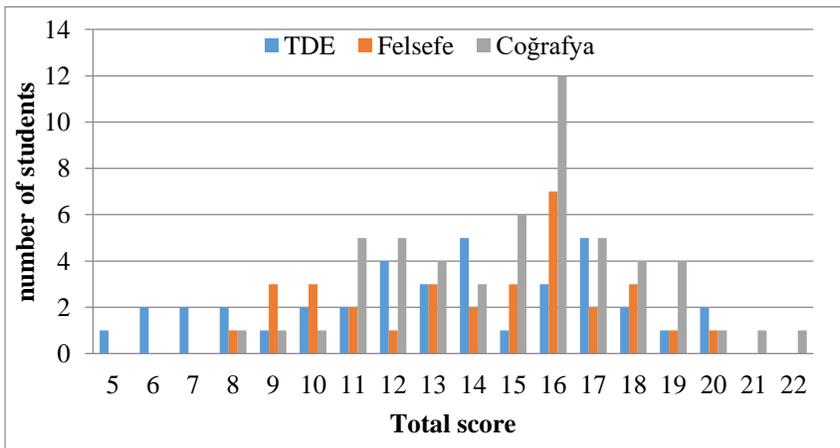


Figure 1: Total score distribution in science questions based on departments

Students' total scores from the questions and the number of students in score intervals are presented in Table 5.

Table 5: Evaluation of score intervals in science literacy questions

Score interval	0-8	9-14	15-18	19-22	23-26
Students	9	50	53	12	0
Status	Too Inadequate	Inadequate	Deficient	Needs improvement	Science literate

There were 9 students in the score interval of 0-8, 50 students in 9-14, 53 students in 15-18 and 12 students in 19-22 while there was no student in the interval of 23-26. The mean was known to be 14,21, and the students whose scores were between 0-8 and 9-14 were below the average. Those 59 students were defined as *inadequate* or *too inadequate* on the basis of science literacy. 9 students in the interval of 0-8 were identified as too inadequate and 50 students in 9-14 as adequate. Even though 53 students in the interval of 15-18 were above the average, they were categorized as *deficient* when the score interval was evaluated on the basis of the answer key as it was understood that students did not have the basic skills for science literacy, and they had difficulty in interpreting what they read. 12 students in the interval of 19-22 were those with the highest scores in the sample of the study. Nevertheless, they need to improve their science literacy skills to be able to explain scientific concepts and design scientific research. This group that was relatively better than the others and categorized as *needs improvement* comprised of 9,7% of the whole sample.

3.5 Results of Reading Comprehension Scale and Success Levels of Science Literacy Based on Departments

In this part of the study, correlation analysis was conducted to examine the relationship between variables, and the results are presented in Table 6.

Table 6: Relationship between the results of reading comprehension scale and success levels of science literacy based on departments

Department	Reading Comprehension		Science literacy		Spearman	R
	Mean	Std. Dev.	Mean	Std. Dev.	p	Correlation coefficient
TLL	41,8158	7,11244	13,1053	4,12500	,742	,055
Philosophy	39,1563	6,80185	14,0625	3,32088	,137	-,269

Between science literacy and reading comprehension self-efficacy scale, it was found that there was a low significant positive relationship in Turkish Language and Literature and Geography whereas there was a low significant negative relationship in Philosophy.

4. Results and Evaluation

This study was conducted with undergraduate senior students studying at the Faculty of Letters. In the first step, their responses to the reading comprehension self-efficacy scale, and in the second step, their ability to answer questions related to the given texts based on science literacy were evaluated.

The students were accepted to the departments of social sciences by showing a common success in the exam held by the Student Selection and Placement Centre, with their reading and verbal skills taken into account. This suggests that those students understand and interpret what they read. Therefore, the reading comprehension self-efficacy scale was given to the students, and they were asked to evaluate themselves in the subcategories of written and visual comprehension, self-regulation in reading, and high self-confidence related to reading. As a result of the study, no statistically significant difference was identified among the three aforementioned self-efficacies of undergraduate senior students studying Geography, Philosophy and Turkish Language Literature. However, with respect to the findings of the reading comprehension self-efficacy scale, which is one of the data collection tools in the study, there was not much difference among the senior students and departments, but the mean was found to be high.

Another subject under investigation was to determine science literacy of individuals. In the science curriculum being updated from 2005 till today, the Ministry of National Education has consistently included in its vision that all citizens should be science literates. Today's undergraduate students are accepted to have been raised in accordance with the target vision of the Ministry. Nonetheless, it is striking that the results of the study indicated undergraduate senior students' inadequacy to be science literates.

The questions to measure the science literacy were addressed in the subcategories as scientific interpretation of data and evidence, explanation of scientific concepts, design and evaluation of scientific research and scientific interpretation.

In question 1 and 3, students given line charts and requested to make comments using the information in the charts related to temperature and

carbon dioxide emission rates by years. Two third of the undergraduate students could not comment on the topic, but Geography students were relatively more inclined to comment. It is, therefore, possible to associate their tendency to read and interpret graphs to studies they do in the field. The results of the studies by Aydın & Tarakçı (2018) and Bayazıt (2011) go along with the results of this study.

In questions 2 and 7, students were expected to find the factors causing a situation and support them with evidence by using the text content given to them. In other words, those questions were asked to measure students' scientific interpretation of data and evidence skills. Harlen (1999) stated that a person who is a searcher, sceptic and interrogator need to collect evidence and interpret the results through questions or guesses in order to test hypotheses or answer questions. From this point of view, undergraduate students are expected to know that scientific information is structured through scientific methods and open to be criticized and questioned. Consequently, knowing how scientific information is proven to be correct and changed helps individuals make decisions related to scientific practices derived from information and their validity (Lonsbury & Ellis, 2002). On the other hand, 84% of the undergraduate senior students were not able to provide scientific evidence in their responses to the questions. Accordingly, it can be inferred that undergraduate students did not use their reasoning skill so they could not interpret the data and evidence scientifically. In point of fact, they often need to corroborate what they read while obtaining information in their daily life, for example, from newspapers or social media. Considering this situation, it was inferred that undergraduate students' levels of interpreting a text and finding supportive evidence in the content were quite low.

In questions 4 and 5, students were asked to explain the main scientific concepts related to the situation in the text. They were relatively better at explaining concepts within the scope of two main subjects on health in comparison with the other topics. They included 60% and 72% explanatory statements in questions 6 and 7 respectively.

In question 6, students were addressed a question based on design and evaluation of scientific research and expected to do a planning. They were incapable of proper planning at the rate of 67,7%, which revealed that the undergraduate senior students had difficulty in planning a scientific study.

In the final section of the study, it was investigated if there was a relationship between the results of the reading comprehension scale and science literacy success levels of the senior students studying Geography, Philosophy and Turkish Language and Literature. Between science literacy and reading comprehension self-efficacy scale, it was determined that there

was a low significant positive relationship in Turkish Language and Literature and Geography whereas there was a low significant negative relationship in Philosophy. Turkish Language and Literature students were expected to possess the top skills of reading, comprehension and interpretation in respect of the field, which was likewise supported by the scores they got from the reading comprehension self-efficacy scale. On the other hand, a strong relationship was expected between science literacy and reading comprehension self-efficacy, but the results showed that students needed more experience in science literacy. The fact that Turkish Language and Literature students could not get the expected scores from the science literacy questions was considered because they had no experience in the subject and lacked the attitude, ability and cognitive competence related to science. It was also the same for Philosophy students; however, they got lower scores from the reading comprehension self-efficacy scale as distinct from the students of other departments. This situation revealed that Philosophy students carried out their self-evaluation more objectively. Accordingly, between Philosophy students' scores of science literacy and reading comprehension self-efficacy scale, a low significant negative relationship was determined. In other words, Philosophy students got low scores from the reading comprehension self-efficacy scale while they were more successful in their answers to the questions of science literacy. Since Geography students had experience in graph reading and interpretation, and data collection and analysis by the field, they responded to the science literacy questions explanatorily compared to the other groups. The related conclusions are supported by the results obtained in the findings section.

Whereas reading comprehension provides a basis in science literacy for scientific interpretation of data with evidence, explanation of scientific concepts, design and evaluation of scientific research, and scientific interpretation, the fact that students comprehend what they read is not sufficient for science literacy. It is necessary to experience different situations and improve skills of scientific process such as deduction, reasoning and classification. Moreover, reading habit is on decline in Turkey nowadays, and the necessary steps are not taken to provide solutions to this problem (Bircan & Tekin, 1989; Yılmaz, 1989).

In conclusion, citizens of today need to be science literates who analyze the events in daily life, think critically, solve the problems encountered in scientific ways, and develop the skill of making the right decisions. They should realize that they need to improve their reading comprehension skills and question what they read by being aware of the fact that “it is necessary for each citizen to be a science and technology literate to carve out a strong future for countries, and science courses play a key role in this process”,

which has been acquired as a vision by the Ministry of National Education since 2005.

It is suggested that studies related to four-operation skills and science literacy of senior students studying social sciences should be planned, and studies on graph-reading which is the basic skill of science literacy should be conducted. Furthermore, it is recommended that undergraduate students of social sciences should tend to select their elective courses in the field of sciences so as to use their cognitive potentials better.

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EFFECTS OF VIRTUAL LABORATORY ON LEARNERS' ACADEMIC ACHIEVEMENT AND PERCEIVED LEARNING^{1*}

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Introduction

One of the main features of effective science teaching and learning is the integration of hands-on activities aimed at the development of science content and process skills through experimental learning. Science education involves experimentally supplementing the theoretical information given in the classroom by means of opportunities for practice in the laboratory. In traditional education, science is practiced through experimentations in a physical laboratory. Physical laboratories are used as one the primary ways of providing hands-on experience to science and engineering students (Chaturvedi & Dharwadkar, 2011). Experiments are usually conducted through demonstration method due to the inadequacy of physical environment or crowded classrooms. On the other hand, limitations such as inability of many students to work in a laboratory at the same time, limited class period, and the need for more time to prepare and carry out all testing make it difficult to obtain the expected efficiency from traditional laboratories (Penn & Ramnarain, 2019). In order to improve students' conceptual understanding and motivation to science, today's information and communication technology offers new ways of experimenting such as computer simulations and virtual laboratories (VL) where investigations involve simulated material and equipment. Virtual worlds are systems that can be accessed online via a multi-user interface, allowing users to interact with each other and the environment and to take various actions (Küçük Avcı, Çoklar, & İstanbullu, 2019). It is important to use virtual learning environments in education in terms of opportunities such as increasing the quality of learning (Chini, 2010), creating online communities (Hazari, & Thompson, 2014) and providing collaborative environments (Erlandson, Nelson, & Wilhelmina, 2010). Researches have revealed that virtual learning environments support interaction, loyalty, motivation, active learning, experiential learning and collaboration. (De Jong, Linn & Zacharia 2013; Dega, Kriek, & Mogese, 2013; Hazari, & Thompson, 2014). Among the reasons for the popularity of VLs, which can

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become an alternative to physical laboratories, are being more manageable, safe, cost-efficient, clean, flexible, and rapid than physical experiments (Zacharia & Constantinou, 2008). VLS offer a solution to the limitations of traditional labs in science education by offering environments for students by using virtual materials through software interface which is connected to a hardware (Lynch & Ghergulescu, 2017). Lhagva, Ulambayar, & Enkhtsetseg (2012) stated that virtual laboratories may contribute to teaching and learning processes by giving students the opportunity to learn by doing, providing them with intriguing and enjoyable activities urging them to discover, and guaranteeing an active classroom interaction by means of discussions and debates.

Virtual science laboratories are software-based tools created to mimic scientific processes as possible in a traditional science lab (Chiu, DeJaegher, & Chao, 2015). Developed on the basis of multimedia and simulation, VLS are frequently used in many areas of science (physics, chemistry, biology, astronomy, earth science, etc.) that students can conduct experiments about unobservable phenomena, such as chemical reactions, thermodynamics, electricity, genetics like DNA extraction. Literature emphasizes that VLS have the following specific benefits (Dalgarno, Bishop, & Bedgood, 2003; Gunn, Jones, Bridge, Rowntree, & Nissen, 2017) comparing to the physical laboratory settings;

- students would feel more relaxed and comfortable in VLS. Since students are not in a physical environment, they will not use any real equipment or consume supplies. Because VLS enable learners to repeatedly carry out experiments with their own pace, they are able to understand underlying meaning of subject matters and gain practical skills,
- less laboratory time would be wasted looking for items of apparatus and setting up experiments,
- students would be more likely to assemble and use equipment in the appropriate way leading to more meaningful experimental results,
- improve students' creative thinking and problem solving skills by giving opportunity to investigate with simulations,
- greater familiarity with laboratory procedures may reduce the likelihood of errors during the activity and may improve safety, and
- students could devote more of their attention to the concepts involved in the experiments because they would already be familiar with the procedural aspects of the task.

In a virtual laboratory, students also may have a more solid understanding of some abstract subject matters and phenomena in science curriculum that are difficult to experiment. Moreover, especially against

possible accidents caused by students' inexperience with some tests, performing experiments on computer will be more convenient in terms of the safety. Also, repeatability and relatively low-cost of experiments on the VLs are quite useful for long-term use. In addition to their distinguishing feature VLs are also allow their user to interface a high level of interaction. In a VL application, users can perform experiments by moving objects with the mouse and the keyboard and by using these objects in the order they want. In addition to displaying a physical object or phenomenon on the screen, such programs also provide user with opportunities to browse over the simulation, repeat procedures, select the various parameter values at the start of each study, observe the occurrence of phenomena, interpret the results, and re-perform procedures with new parameter values (Karagoz, 2006). Learners who have gained experience with VLs actively participate in lessons by combining audio-visual diagrams (Stuckey-Mickell & Stuckey-Danner, 2007). This encourages learners to seek solutions for real life related problems. Thus, learners learn not to be afraid of making mistakes. As previously emphasized with this method they get the opportunity to repeat the procedures. Moreover, learners have the opportunity to use a VL program, acting independently of time and space (Bozkurt, 2008).

There are many studies evaluating the educational effectiveness of VLs in education. All studies used experimental design strategy to understand the potential of VLs in education. All but one study was carried out with the college-level students. Many of them used quasi-experimental design whereas some of them were able to conduct true-experimental settings. Some of these studies suggest that VLs are very effective in preparing for traditional laboratories as a complementary tool (Abdulwahed & Nagy, 2009; Chaturvedi & Dharwadkar, 2011; Hawkins & Phelps, 2013). While some of the studies comparing the performances of learners in VLs and hands-on laboratories indicate that conceptual change is possible with both virtual and real application experiences, there is no difference between learners' performance in these two environments and learning objectives can be achieved (Hawkins & Phelps, 2013; Lammi, 2009; Oser & Fraser, 2015). Some have concluded that virtual laboratories are more effective than traditional laboratories (Penn & Ramnarain, 2019). In addition, it has been revealed in some studies that the perceptions of learners are positive in studies that examine the approaches of learners towards computer simulation based experiences (Kamlaskar, 2009; Stuckey-Mickell & Stuckey-Danner, 2007).

While some of the studies comparing the performances of learners in VLs and hands-on laboratories indicate that conceptual change is possible with both virtual and real application experiences, there is no difference

between learners' performance in these two environments and learning objectives can be achieved (Hawkins & Phelps, 2013; Lammi, 2009; Oser & Fraser, 2015). Some have concluded that virtual laboratories are more effective than traditional laboratories (Penn & Ramnarain, 2019). In addition, it has been revealed in some studies that the perceptions of learners are positive in studies that examine the approaches of learners towards computer simulation based experiences (Kamlaskar, 2009; Stuckey-Mickell & Stuckey-Danner, 2007).

In a world going through an era of digital technology, one should keep in mind that learning does not take place solely at school. Individuals will need people and institutions to guide them when they are involved in any learning activity or when they acquire new knowledge and skills in formal, non-formal, or informal settings. Therefore, it is essential that we inform teachers who are capable of teaching new generations to keep up with the change and development and meet the contemporary requirements. In this sense, teacher competences need to be improved and teachers should be equipped with the information technology literacy. Teachers' inability to keep up with the rapidly evolving and advancing technology could be considered as a problem. Their failure to follow developing technology means their rigidity of closure to innovation and, therefore, the lack of knowledge and skills that the students need. Teachers need to complement their existing teaching with computers and other innovative educational tools. By the same token, being an effective and efficient science teacher of future is closely related to possessing the expected competencies of new technologies such as VL applications. A review of the literature, on the other hand, provides limited research on the effect of VLs on teacher candidates' learning experience (Gunn et al., 2017; Olympiou & Zacharia, 2012).

Within this view, the current study was conducted with preservice science teachers to explore the effects of VL activities on learners' academic achievement and perceived learning in a physics class. There were two groups of learners called as Groups A and B. The Group A simultaneously performed both traditional face to face laboratory activities and VL practice throughout a four week activity and the Group B took the traditional hands-on laboratory course and perform the VL activities only at the end of the semester. The study sought answers to the following questions:

- What is the difference between and within the pre and post achievement scores of both groups of learners?
- What did the students in Group A and B experience about physical laboratory and virtual laboratory practices, taking into account their individual learning processes?

Both groups experienced electric circuit applications during a physics course. This study, therefore, could be significant as it promotes virtual laboratories, it shows the benefits regarding learning and learners and it could inspire future research to address various aspects of the subjects such as practicability, instructional considerations, permanency and the potential for saving time.

Method

Research Design

A sequential explanatory mixed methods design was used involving both quantitative and qualitative data. In order to support the quantitative data outcomes and to increase the reliability of the study, qualitative data were used following the quantitative data analyses. In this approach, the primary method is quantitative and the qualitative data were collected to support and enhance researchers' understanding. Therefore, quantitative data (pre-and post-tests) were collected and analyzed in the first phase and the results used to inform the subsequent qualitative stage. The qualitative stage helps to understand the unpredicted outcomes that occur at the initial quantitative stage.

More specifically, in the quantitative phase, a pre–post quasi-experimental study design was used that involved 65 pre-service science teachers. The participants attended a one semester course in physics with laboratory activities. Students attended a 3-hour laboratory lesson per week according to their own choices. Both groups used the same curriculum during the semester. Participants in the Group A (n=33 students) participated physical hands-on laboratory with a supplementary of and VL applications during the semester whereas, the participants in the Group B (n=32 students) conducted experiments in the physical laboratory and only took the related VL program at the end of the semester. Pre and post achievement tests were administered to assess learners' conceptual understanding in electric circuits before and after the teaching intervention. Then the qualitative approach was used to further investigate the participants' experience in the light of the results of the statistical analysis of the data obtained in the quantitative phase. In this phase, selected students from both groups were interviewed to gain a deeper understanding of their use of the VL application. Table 1 shows the data collection process used in the study.

Table 1. *Research process of the study*

Groups	Phase I: Quantitative			Phase 2: Qualitative
	Pre-Test	Intervention	Post-Test	Interview
A	Conceptual Test	Traditional + VL during the semester	Conceptual Test	Semi-structured interviews
B		Traditional + VL at the end of the semester		

Study Sample

This study was conducted with 65 freshman college students who were studying science education in a state university in Turkey. Students attended the General Physics Laboratory II course given in the first year of the Department of Elementary Education.

Table 2. *Distribution of students of groups*

Gender	Group A	Group B
	n (%)	n (%)
Male	5 (15)	8 (25)
Female	28 (85)	24 (75)
Total	33 (100)	32 (100)

Table 2 shows the gender distribution of students in groups A and B. In Group A, who were offered the traditional laboratory practices simultaneously with virtual laboratory applications, 28 participants (85%) were female and 5 (15%) of them were male. Group B consisted of 24 (75%) female and 8 (25%) male students who performed regular face-to-face laboratory activities during the semester and supplementary virtual VL were only offered at the last week of the term.

The Context of Virtual Laboratory

An electrical circuit model on *eChalk* website was used as the virtual laboratory practice for this study. Before the initiation of the process, the VL practice was introduced to both Group A, who will be given the virtual laboratory practice throughout the process, and Group B, who will be given the practice only in the last week of the process. The introduction of VL was carried out in a computer lab, where each student experienced the program individually. During the orientation, all the software elements

were explained in question-answer format. Since the language of the software was English, all possible scenarios that the learners might face were translated into Turkish language. It is assumed that the effect of foreign language on the result will be eliminated with the Turkish user manual.

Although the VL software was a commercial one, it was used free of charge by obtaining the required permissions from the software company. After determining the pre-test scores for both groups, in addition to traditional lab sessions, Group A was requested to do virtual laboratory activities as assignments.

These assignments were delivered to the learners' e-mail addresses. With an instruction, the learners were informed on which materials to use. Apart from these assignments, the learners were free to do additional practice in the software. The laboratory topic "electrical circuits" lasted a 4-week period in a one-term physics laboratory course. Throughout the four-week period, Group A both studied the experiments in the face-to-face laboratory environment and had the opportunity to use the VL software. Group B, on the other hand, studied the concepts in their four-week sessions only in the face-to-face lab environment. The VL's introduction session and the related assignments for the participants in the Group B were administered at the end of the fourth week.

Data collection Tools and Process

Achievement (Conceptual) Test

In the development process of the achievement test, the related literature has been examined and associated with the objectives of the course in order to determine the topics that the participants need to learn about "Electricity in Our Life". The learning outcomes of the topic "Electricity in Our Lives" were identified and literature was examined based on these outcomes. Then, the 27-item achievement test was developed based on the questions related to the topic "Electric Circuit" covered. The content validity of the achievement test was determined by five field experts including three science teachers, a research assistant and a faculty member. The achievement test was initially administered to a group of seniors studying science education at the same institution. By means of this application, item analyses were conducted. Based on item difficulty indices in the test, four questions were excluded from the instrument. The excluded questions did not lead to any contraction in the table of specifications and the remaining 23 questions still met all of the specified outcomes. Since each question value is 1 (one) mark, the possible highest score was 23 and the lowest was 0. Both groups were administered

an achievement test in order to determine their levels before and after the VL applications and their mean scores were compared using within and between group comparisons.

Semi-Structured Interviews

To support the quantitative data obtained from the achievement tests and explore learners' experience in depth way, face-to-face interviews were conducted with the learners who fell into edge achievement scores (two learners who increased their achievement level most and two students who decreased their achievement level most) and with those whose achievement scores did not show any progress. To explore in greater detail and more salient points of VLs, the semi-structured interview technique was used. To extract the views of learners in Groups A and B on the VL application, semi-structured interviews were conducted with 11 learners out of 65 students in total. Prior to the interviews, the learners' consents were obtained to keep their responses with an audio recorder.

Data Analysis

Analysis of Quantitative Data

The achievement test was administered as a pre-and-post-test design to all the participants of the two application groups. Inferentially dependent samples were analyzed using both descriptive statistics such as frequency, percentage, mean and standard deviation and the inferential statistics. Hypothesis tests were used to test the statistical difference between the pre-and post-test results within Groups A and B. Firstly, the pre- and post-test achievement scores of participants from Group A and Group B calculated and then the distribution of the difference between the average scores of these tests were analyzed. Normality assumption was checked both graphical approach and hypothesis testing. For all achievement test results, normal distribution criterion was achieved and paired samples and independent samples t-tests for group comparisons were used. The post-test achievement data was analyzed using one-way analysis of covariance (ANCOVA). The ANCOVA examines whether means on the dependent variable (post-achievement test) are the same adjusting for differences on the covariate (pre-test scores). Since there was a significant difference between the pre-test scores of Group A and B learners, ANCOVA was conducted to compare the two different VL application processes on post-test scores after controlling the initial achievement scores of students.

Analysis of Qualitative Data

In the thematic descriptive analysis, the themes were determined by making extractions from the data and considering the concepts. Data

analysis initially included creating codes and then developing the themes of set of codes. To provide the trustworthiness in the analysis of qualitative data, two field experts were asked to provide feedback for the codes and themes created. Some revisions were made when there were any disagreements among them. Data analysis yielded five main themes named as educational aspect, interaction, usefulness, satisfaction and technical and procedural aspects of VL application. Direct quotations from the responses of the learners (L) were used while reporting the findings and the participants were named as L1, L2, L3 and so on.

Limitations of the Study

Although the use of mixed method including quantitative and qualitative approaches is a fairly common method in the field of educational research, this study does not provide a complete picture of these assessments. For instance, designing study with two experimental groups without a control or comparison group and also focusing on one particular subject (electric circuits) matter in a physics course are the main limitations of the study. Although students were recommended to use the VL application, only some of them actually used it because this practice was not mandatory, such as face-to-face one. However, all student groups are included in the quantitative data analysis. During the implementation phase, some students face with technical difficulties or were unable to demonstrate their practical skills on how to operate laboratory equipment.

Findings

Results from the Phase I

The pre-test was administered to the both groups A and B at the beginning of the process. Data were analyzed by independent samples t-test. The related descriptive statistics for pre-test scores for both groups were summarized in Table 4. The test included a total of 23 questions. The average score for Group A was 13.70 while it was 12.44 for Group B. The variance distribution for both groups was very close to each other. In other words, the pre-test average scores of the learners from both groups showed a similar dispersion. Independent samples t-test with a homogenous variance setting indicated that there was a significant difference between pre-test achievement test scores of the learners in Groups A and B, $t(63) = 2.049$, $p > 0.05$.

Table 3 shows the analysis results before and after the VL application for Group A and B. While the pre-test achievement average scores in Group A was 13.70, their post-test scores reached 15.00 by the end of the four-week period. This increase in the scores was also a reflection of traditional laboratory sessions and the other factors, including VL applications. As a result of paired samples t-test, test mean scores of pre

and post assessment showed a significant improvement in Group A's learners, $t(32)=2.836$, $p<0.01$.

Table 3. Pre and post-test average achievement scores for learners in Group A and B

Groups	\bar{x}	n	s
A Pre-test	13.70	33	2.468
A Post-test	15.00	33	2.692
B Pre-test	12.44	32	2.487
B Post-test	14.28	32	2.593

\bar{x} : Mean Score

Similarly, there is a significant increase in mean scores of pre ($\bar{x}=12.44$) and post ($\bar{x}=14.28$) tests in Group B, $t(31)=2.635$ $p<0.01$. This significant differences indicate that the students in both groups gained in their conceptual understanding of electric circuits. Yet again, explaining this difference by only using of VL utilized in the last week by the learners of this group is not possible. Qualitative data obtained from the interviews conducted a basis to explain this finding.

One-way analysis of covariance (ANCOVA) was used in order to compare the two groups of learners' post-test scores after controlling their pre-test achievement scores. Actually, this analysis attempted to control for the pre-existing advantage of Group A who wind up. Table 4 summarizes descriptive statistics of post-test achievement scores. In the table, 5% trimmed means ($\bar{x}_A=14.80$; $\bar{x}_B=14.49$) indicate the means calculated from the 90% of the observations after the lowest 5% and highest 5% of the data are excluded. As can be seen, these means are practically very close to each other.

Table 4 Descriptive Statistics of Post-Test Scores for Groups A and B

	Groups	n	\bar{x}	5% trimmed mean
Post Test Comparison	A	33	15.00	14.80
	B	32	14.28	14.49

Table 5 displays the one-way ANCOVA test results. The results for the post-test achievement data indicated that there was no statistical significance found in the means of the scores between the participants in Group A and Group B, $F(1, 62)=0.216$, $p=0.644$. In other words, presenting VL in or after the process had no significant effect on success. It was not observed that the application had a different effect on the final performance after taking into account of the pre-existing learning.

Table 5. *One-way ANCOVA results of the post-test scores*

	Source of Variation	Sum of Squares	df	Mean Squares	F	p
Post-Test Scores	Pre-Test Scores	42.394	1	42.394	6.603	0.013
	Groups (A & B)	1.387	1	1.387	0.216	0.644
	Error	398.074	62	6.421		
	Total	14392.00	64			

According to these indices, no significant effect on achievement was observed the types of the VL intervention in the current sample of learners.

Results from Phase 2

As stated at the beginning, phase 2 was performed to better understand and interpret the results of quantitative analysis. The educational, usefulness, interaction, satisfaction and technical and procedural aspects of virtual laboratories were discussed as a result of a thematic and systematic analysis of the responses of the interviewed students.

Educational Aspect

According to the statements of learners from both groups, nine learners expressed that the VL practice contributed to their learning while two of them claimed the opposite. Nine of the learners justifying that VL application contributed to their learning stated that they had completed their theoretical knowledge by reading but they had problems in envisaging the events and learned to conduct an experimental setting by practicing with the virtual laboratory. For example;

L2: I believe it contributed. I cannot mentally visualize the events by reading. I was able to see my mistakes by practicing.

L7: I did not know how to set up wiring. Thanks to the virtual lab I learnt.

Since learners in Group B used virtual laboratory applications at the end of the process, they stated that it did not make any contributions to their learning because they used it with a limited time: For example;

L10: Since I used it only once I believe it did not contribute to my learning.

Extensive use of VL applications made positive contributions to learning scientific skills and visual elements in VL program increased the attention of learners. In order to keep this attention alive and at a high rate, voice option may be required in the software. Learners stated that they realized this lack and for any changes in the components, feedbacks, successes, etc. voice notifications should exist:

L9: I understood better visually. In our courses, I was unable to visualize it. There was some inadequacy in terms of voice; that would be great if they added some voice effects.

Both cognitive and affective skills need some time and effort to be learnt. Inadequate time allocated for learning might limit the expected efficacy of materials to be used. Some of the interviewed learners indicated the insufficiencies of face-to-face laboratory practices as follows:

L2: In face-to-face laboratory environments we had problems in terms of material and time. When these are improved, I believe it will be more effective.

L6: There were insufficient tools in face-to-face laboratory, so we were learning in a limited way.

Virtual laboratory technique provides a freer learning environment considering the fact that there were no place, time and tools constraints. For this reason, while doing experiments in virtual laboratory, learners stated that they enjoyed more and they enjoy while learning. Learners also highlighted that they did not see the assignment as a task but as an activity done with great joy:

L7: Our learning was better without time, place and tool constraints. I was able to use it whenever I want without depending on anyone.

L8: In normal laboratory environment tools may be lacking or broken; so you cannot learn. Bu in virtual laboratory you do not have this constraint. Besides, it is more economical.

While doing an activity, one should act expediently and a convenient environment should be prepared. Both individual and group work activities can be done in such learning environments and some experiments are expected to be done individually while others as a group. At this stage, what learner is expected to do in the experiment should be analyzed elaborately. Participants put forward different views on positive and negative sides of collaboratively performed experiments in face-to-face laboratory environment:

L1: In a collaborative learning environment, we performed the experiment with the help of our friends.

L5: Working individually is better. People learn better themselves.

Learners stated that group members in group works contributed to each other's success in regular laboratory settings. Learners also indicated that individual works took more time compared to collaborative ones. With collaborative works it was observed that the time for the experiment decreased while the interaction increased. However, the learners who

preferred working on their own just stated the opposite. On the other hand, learners stated that studying with two or more people on VL program would be more useful. For the virtual laboratory practice, learners advocated their beliefs that doing the experiments in groups would improve their learning skills as follows:

L6: I am in favor of collaborative learning; new ideas may come out through peer discussions.

L7: Doing virtual laboratory with a friend would be more useful. By asking our friends some things, we can find quick solutions to problems.

There were learners who claimed that doing virtual laboratory practices individually would be more useful compared to working collaboratively:

L10: I believe that virtual laboratory practices should be done individually.

L11: Doing virtual laboratory practices individually is more appropriate.

Anyone may encounter a problem at any time in daily life and, in fact, they do. Solution of this problem varies from person to person. As meaningful learning requires a higher order mental process, every learner may not use this in solving problems. Whether or not learners are young, adult or elderly, encountered problems are generally solved through trial and error method. Four of the learners who shared their views on VL applications stated that they had no problems:

L1: The reason why I damaged circuit elements was because of the high voltage I used. Later on, with the help of my teacher, I found the appropriate voltage setting and completed the experiment.

L3: Yes, I did. I got help from the teacher and I created a solution by myself.

Just as there were those who experienced virtual laboratory applications before, also some of the first-time users existed. For most of the learners, it was the first time they had ever been introduced to VLs. For this question, which focused on individual differences, some learners had problems while others did not have any struggles in performing the tasks. Learners indicated that they had no problems thanks to the guide given and everything was clear about the application:

L7: No, I did not have any problems. In training videos and printed guide, how to do it was explained.

Either because of individual differences or handiness, two VL participants stated that they had problems but overcame them with trial error or with guidance by the teacher:

L6: Yes we did. We had problems because of lack of information. We tried to create a solution but asked our teacher for help.

L8: Yes. I had problems in setting up the circuit. I solved the problem by changing the place and values of the circuit elements.

In addition, learners stated that doing virtual laboratory applications just after the face-to-face laboratory practices contributed to their learning:

L1: We applied our theoretical knowledge in the laboratory; there was no inadequacy, everything was pretty much consistent.

L7: Both were completing each other.

Regarding the educational aspect theme in general, learners stated that they had problems initially but eventually they overcame it and enjoyed the activities. They also stated that the practice provided a free learning environment and made a positive contribution to their learning skills if used intensively. Moreover, the fact that the practical session was easy to understand and very clear and visually rich also contributed a lot to their learning. At this point, VL applications should be considered as an effective educational support tool in providing meaningful and sustainable learning.

Satisfaction

A person's needs, existing value judgments and conformity with the work he or she is doing reflect his or her level of satisfaction. Concerning the aspects such as a person's enjoyment of the process, managerial method applied, matching the needs with the application and being affected by the environment, the total perception created by the individual is called satisfaction. With its conceptual meaning, satisfaction can be defined the feeling of joy people have when they meet their own expectations, needs or desires (Süral, 2012). It is important to ensure the satisfaction of people to get high efficiency from the work performed. In a learning process, a learner's positive perception towards the application affects learning process. A Learner's positive attitude towards a course makes his or her learning easier. Learning and perspective of the application supports each other. We could therefore conclude that the process was effective with the pleasure of learning. As the learners realized the efficacy of the process, their level of enjoyment increased. The learners' views are as follows:

L6: As for virtual laboratory, I was able to use it frequently since it was available all the time.

L10: I was satisfied.

In the light of this, we could suggest that the learners were satisfied because both the face-to-face laboratory practices and VL application contributed to their learning process. On the other hand, the learners were asked whether both the practice and the application presented any useful

sides for them. Nine of the participant learners stated that both the practice and the VL was useful for them:

L1: We have learnt simple and useful things that can be used in our daily lives.

L7: It was useful. As an assignment we were expected to prepare a project at the end of the term. Thanks to the virtual lab, we have easily completed the project.

Learners indicated that virtual laboratory applications were enjoyable and interesting. They stated that, as they learnt more, they enjoyed it and as their intrinsic motivation increased, their learning became easier and these two depended on each other.

Usefulness

International Organization for Standardization (1998) defines usefulness or usability as users' satisfaction from a product by using it efficiently and productively to achieve their goals. When supported with technology, teaching and learning processes improve learner achievement. With the help of technology, teaching and learning activities become more useful. Usefulness expresses the simplicity in using the materials provided by technology. We can specify some basic elements in the usefulness of a software as follows: if the user can select the desired elements, freely change the values of them, communicate with the experts and the software immediately contacts with the user, then we can suggest that the usefulness of this software is at a high level.

In addition to interaction, using the materials provided in the experiment is important. Some learners defined usefulness as abundance of the materials whereas some explained it as re-using them. Learners in Groups A and B indicated that they easily used the materials in both face-to-face and virtual laboratories. They stated that they easily used the materials in virtual laboratory:

L1: Yes, I easily used them. At the beginning, I couldn't, but after getting some help, I was able to use necessary materials appropriately.

L9: It was useful enough. Using it repeatedly was fine.

Learners who were involved in both of the applications were asked whether they preferred learning in front of a computer to face-to-face learning in laboratory. Among the participants, three learners clearly stated they did not. They explained that there was no synchronous communication with the instructor. Learners further stated that they preferred face-to-face laboratory practices:

L1: I do not. While in front of a computer, we cannot join dual application. During the application, unanswered questions cannot be answered on time because we cannot have two-way communication. Because of these reasons, I prefer face-to-face laboratory practices.

L2: I do not. As an application, it has advantages in terms of visual and audio features. Moreover, we can find answers for the questions we wondered. If both can be applied at the same, that would be perfect; but if I have to choose, I guess I would prefer face-to-face lab.

On the other hand, seven other students stated that tactile learning was more useful for them. Moreover, they stated that these two applications shouldn't be separated; instead, they should support each other and this support should take place while learning the subject and experiment in face-to-face laboratory and then consolidating on computers. Also, there were some learners who advocated first learning and consolidating on computer then moving on concrete learning in face-to-face laboratory environment. In terms of practicality and continuity, the learners argued the virtual laboratory application and traditional laboratory practices should support each other:

L3: I don't. Doing by touching and feeling is better. They should support each other.

L5: No. In face-to-face lab you're not dependent on mouse and you can feel the tools. After the application computer software can be used for consolidating.

L7: I do not prefer face-to-face lab. After learning how to do the experiment in virtual lab, we can quickly finish doing it in face-to-face lab.

L9: Yes. The things that I learn by doing are more permanent. In face-to-face lab we don't have the opportunity to do something over and over again, but in virtual lab we have that, and it becomes more supportive.

Because the learners were not familiar with the program and the application, they were first introduced the software. The participants who were not at school during the introduction stated that they couldn't attend the introduction session, but, thanks to the guide given, they were easily able to use the program. In addition, because the language of the program was English and the learners were not proficient enough in English, English-to-Turkish translated form was handed out with the support of visual elements so that learners did not have any problems. Therefore, a precaution was taken against language barrier. Among the participants, nine learners stating user guide was useful also indicated that the translations were clear and informative:

L2: I had a look at the user guides as I couldn't join the introduction part and I easily used it by applying myself.

L7: The software was in English, so I had difficulty but then I had a look at the user guide and overcame this by applying. The program was also useful since we were able to make changes in variable values.

In the findings obtained from “usefulness aspect”, learners stated that accessing the material in the virtual laboratory application and being no place and time constraints helped them use the application easily. In addition, they indicated that virtual laboratory application was easy to use and they could easily change the values of the circuit components: thus, it was a fine application to support the learning of the topic. They also stated that with the help of the translated user guide handed out by the researcher, the application was clear and precise for them.

Interaction

Human beings are social. They perceive their surroundings by continuous information exchange. Inherently, human beings need to communicate according to their needs. This communication can be either in the form of living-non-living or living-living. This mutual influence is called interaction. Educational practice is based on subject-specific communication, but it is impossible without interpersonal communication (Peciuliauskiene, 2015). An individual who is open to interaction must be open to mutual information exchange and respect different views. Interaction can be classified as learning-learning, teacher-learning, learning-teacher and material-learning. *eChalk* educational software, through which virtual laboratory environment was created, can be seen as a living-non-living type of interaction. Additionally, in this study interaction was provided through the assignments between the instructors and learners. The majority of the participants stated that the interaction in VL applications was adequate. Some of those views on interaction are as follows:

L2: It was adequate. With the help of interaction, I was able to immediately access the solutions of the problems in my mind.

L5: For me it was adequate.

Also, the participants indicated they found the VL application adequate in terms of interaction because it contributed to their learning:

L8: Yes. It was adequate. We were interacting with the teacher. I was able to do without getting help from my friends.

L9: It was adequate. When I couldn't do the experiment, I sent an e-mail to my teacher and got the necessary help.

Highlighting the positive contributions of being able to communicate with the researcher in virtual environment, the participants stated that they

had positive contribution to their learning. On the other hand, two participants stated that they did not find virtual laboratory application good enough:

L10: It was not adequate. Because of individual performance, learner-learner dialog was not established.

L11: Because it was on a virtual environment, I don't believe the interaction was adequate enough. Face-to-face is more effective in this term.

These two students attributed the inefficiency of the virtual laboratory to the lack of peer-peer interaction. In all VL programs, users interact with virtual experimental tools and the content. This type of interaction refers to intrapersonal communication that can be defined as communication with one's self that may be with the interface, resources or content. VL programs, users interact with virtual experimental tools and the content. This type of interaction refers to intrapersonal communication that can be defined as communication with one's self that may be with the interface, content (Chini, 2010). Many virtual applications also support interpersonal communication. Even though research states virtual labs shorten the time of real communication of students, the time of learners' experimental activity in the virtual environment is prolonged (Peciuliauskiene, 2015, p.687).

Technical and Procedural Aspect

By definition, technicality is defined as deciding on instant behaviors and skills in case of incidents (Kızılkaya & Aşkar, 2009). Access to virtual laboratory program is provided through the Internet. Among the participants, 27 students participating in the application stayed in a state funded higher education dorm in the city. The students who had their own computers and stayed in a dormitory used the Internet connection service provided by the state. However, those who did not have their own computers used the computers in Internet cafes to do the application. During the process, because there was one assignment done with the group-based involved in the virtual laboratory application, these conditions did not constitute any problem for them. For Group A, participating in the VL program throughout the process, lack of Internet connection in the computers was a problem.

L7: I had Internet connection at home. The Internet connection requirement of the software was not a problem for me.

L9: Some Internet connection problems caused troubles sometimes. But, if it could be used offline, it might have been more useful.

Virtual laboratory software was introduced to the students as a 30-minute session in the school computer lab. Throughout the process, the software was introduced in details and with a mutual interaction with the learners. Nearly all of the learners stated that they were able to use the software only participating the introduction session without a need for the tutorial video. In fact, only one learner indicated that he was able to use the software fully after watching the video tutorial:

L8: No, I didn't watch. I just looked up the Turkish version of the user guide and did it.

L7: Yes, I needed it. By watching the video, I learnt how to use it.

The traditional laboratory participants could come to the laboratory only in their assigned laboratory sessions and they were observed to carry out the experiments in a hurry because the class time was limited. The participants indicated that they were not able to do the experiments in face-to-face labs out of class hours:

L5: No, we were able to do it only once because the time was limited.

On the other hand, the virtual laboratory participants stated that they were able to do the virtual laboratory experiments more than once and saw it as a game. Being able to do as much as they want in virtual laboratory environment, the participants commented as follows:

L3: I found it in virtual lab. It was more like a game for me. But I was unable to do it again in face-to-face laboratory since the conditions were not appropriate.

L1: Yes. I consolidated it by setting up different experiment sets in virtual lab.

The learners who carried out experiments in the face-to-face laboratory indicated time and place constraints. With the questions aiming at privatizing these constraints learners stated that they could go to the laboratory only in assigned hours and this was only two hours a week:

L4: One class hour a week.

L5: Two class hours a week and it was adequate.

L6: We couldn't use it outside the class hours. Two class hours a week.

For some learners, virtual laboratory was attractive while for some others, it was not. Some virtual laboratory homework was assigned to monitor the process. This homework was aimed at both permanent learning and practicality for the learners. During the interviews with five participants who were exposed to VL application throughout the process, two of them declared that they used the program when a homework was assigned, two others used it very few times and one learner indicated that

he continued using it even after the course ended. This difference among participants can be explained by personal preferences, technical and procedural limitations. The learners' responses on this issue are as follows:

L7: I used it when an assignment arrived. I never used it otherwise.

L9: I used it frequently. Apart from assignments and even after the course end date I'm using.

L10: I used it once or twice.

Experiments has a key role in every phase of science course. The learners stated that the VL-based learning process contributed to their conceptual and practical understanding. Those who argued the opposite were observed to use the application rarely. The more a learner uses his or her senses in learning process, the more permanent learning occurs. The biggest benefit of learning by doing can be seen as such. Redundancy of the stimuli for the learners can be said to have a direct proportion with learning. In the laboratory activities, the learners stated that there were quite sufficient visual stimuli in the process.

Face-to-face laboratory is insufficient in terms of time, place, and material when compared with VLs. Being able to carry out the experiments more than once and change the values of the material variables in the experiment provided convenience for learners. Both in face-to-face and VL environments, individual differences came forward whether learning should be individual or collaborative process. By performing experiments with trial-error method each learner developed a solution for the problems that may occur throughout the process. The learners in our study stated that since the class is crowded in the traditional laboratory environment, it was difficult for the teacher to reach the learners. However, this was not the case with the VL environment. On the other hand, they reported that in VL environment there were some differences in the time of the feedback depending on the situation. An important factor in learning is the simplicity, accuracy and clarity of the material, experiment or software used. The learners found virtual laboratory software useful and effective enough. At this point, it is useful to emphasize one point; the learners who declared that the program was useful were satisfied, used it appropriately, and handed in the assignments on time and they were content with the process.

Discussions, Conclusion and Recommendations

This study was conducted to determine the effects of VL application used by pre-service science teachers on their physics achievement and perceived learning experience. While the average of the scores for the participants in Group A were 13.70 at the beginning of the process, at the

end this value increased to 15.00. From the conceptual achievement test applied prior to the process, the average score for Group B was 12.44, which increased to 14.28 at the end. The pre- and post-test scores in Group A provide some information about the effectiveness of the process more or less. There was a significant difference between the pre-test and post-test scores of Groups A and B. There was a significant difference between the average scores for achievement tests of Groups A and B before the treatment, but after the teaching intervention this significant difference disappeared when controlling the initial scores of learners.

Most of the participants indicated that virtual laboratory software enhanced their understanding of scientific concepts. The learners who indicated that virtual laboratory software contributed to their learning also stated that they grasped their theoretical information by reading but could not conceptualize or visualize this information. However, they declared that VL practices assisted them to set the experiment set and they learned by doing. Similarly, Beltz et al (2016) stated that carefully designed online lab opportunities can result in higher student grades and more favorable attitudes towards science. Also Bozkurt (2008) stated that VL application was informative according to student interviews. Their motivation and interest for the course also increased.

Almost all the participants found the teacher-learner interaction for the VL applications adequate. The learners who stated the limited interaction in the face-to-face laboratory activities shown the crowded class as a main reason for this. Bayhan and Demirtas (2009) in their study reported that in traditional laboratory settings crowded groups were unable to conduct experiments on their own and this barrier was solved by virtual laboratory applications.

The learners in both groups stated that they felt comfortable using the application because there was no risk of damaging for virtual laboratory materials. It is stated that there is no such problem in the virtual laboratory environment. These learners also indicated that not being able to repeat the activities in the face-to-face laboratory out of class time posed a limitation for them. They reported that they overcame such problems with the help of translated user guides and indicated that these translations were clear, informative and instructive. Karagoz (2006) suggested that the learners using virtual laboratory were able to find out the mistakes in an electric circuit because they freely and repeatedly used the application throughout the process.

For increasing retention rates and practicality for users during the process certain virtual laboratory tasks were assigned to the learners. As in other learning environments, some learners stated that they got more

efficiency from both face-to-face and VL applications because they fulfill the assigned tasks. Bortnik et al (2017) suggested that blending both virtual and physical lab activities has the potential to enhance students' skills and practices. On the other hand, some learners have shown resistance in using the VL application. Therefore, it was assumed that those who had low internal and external motivation did not succeed in learning concepts and practicing with VL.

In addition, in order to eliminate the language of the program as a barrier in use, the user manual and the visual elements in the interface of the program have been translated into Turkish. In addition, in order to eliminate the language of the program as a barrier in use, the user manual and the visual elements in the interface of the program have been translated into Turkish. In order to ensure the effective use of such programs, it is important to determine the limitations of the design before implementation phase. Even if necessary, it will be appropriate to carry out localization studies in accordance with the curriculum and context of the study.

All of the learners who were interviewed stated that they were satisfied with both face-to-face and VL applications. Because the application included rich visual elements, it served as an attractive and enjoyable experimental environment. This visual richness in VL programs helped learners focus their attention on the material. As stated by Chini (2010), since VL programs increase the interest in learning, this kind of applications have positive effects on learners' academic performance. Participants suggested that group-based experimental processes should be well planned otherwise some learners could not join the activity, so experiments should be carried out individually. A few learners clearly stated that they would not prefer virtual laboratory to face-to-face environment. The participants also claimed that there was no instant feedback from the teacher to the learner so face-to-face environment seemed more convenient in terms of this aspect.

When the students use the virtual laboratory program more, the components of the electrical circuit can be easily tested. By changing the values of these components, they saw the possible outcomes. They realized that the engine worked only it took the energy required and when a bulb was provided excessive amount of electricity, it blasted. In addition to performing dangerous experiments with VLs, even simple experiments prevent excessive use of materials. At the same time, students' curiosity has always been kept alive. With the inclusion of simulation-based activities in the experiments, it has been observed that the students observe the cases that cannot be seen in real experiments and this draws their attention. Bozkurt (2008) also reported a similar finding; VL applications

are very effective in presenting phenomena that cannot be directly observed. On the other side, some learners argued that learning by touching and feeling the materials was better. They also claimed that these two applications should not be separated, but, instead, they should support each other, which will be more positive in terms of learning skills. They discussed that this support should be in the form of learning and experimenting concepts in the face-to-face laboratory environment rather than reinforcing the skills learned in computer software. In addition, computer software should be developed based on the needs and interests of the learners. Computers are used as support tools in learning environments. As stated by Lynch, & Ghergulescu (2017) computer assisted educational applications provide an application field as a solution for limitations of conventional laboratories.

Recommendations for the future studies

In this study, two experimental groups were formed without a control group. The main purpose is to examine whether the VL application has different effects on learning during or after the process. Although there was no statistically significant difference in students' conceptual test results in the final measurements, the perceived learning of students who were subjected to VL application during the process was much more positive. We believe that our findings could contribute to the future research on virtual laboratory skills. In future studies, a control group that is not exposed to VL administration may also be included in the design. Based on the findings from the current study, it could be suggested that the effects of virtual laboratory applications on learners' achievements on other science subject matters should be studied. Future studies could be focus on the effects of VLs on retaining knowledge over the short-term or long-term. Finally, similar studies should be carried out at different grade levels and applications based on different methodologies.

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EXAMINATION OF SCIENCE EDUCATION STUDENTS' KNOWLEDGE OF WEAK INTERACTIONS BETWEEN CHEMICAL SPECIES

*Sevgül Çaliş**

1. Introduction

In today's world, the importance of physical sciences is increasing some more with every passing day. For this reason, it is important to teach the science of chemistry, a branch of physical science, well, too. Educators and researchers being interested in chemistry acknowledge chemistry as a difficult science (Nakibođlu and Kalın, 2009; Tseitlin and Galili, 2006; Ben-Zvi, Eylon and Silverstein, 1987). Although some students spend effort to understand the concepts in the subject of chemistry, they are unable to become successful at this sufficiently (Nakhleh, 1992). Especially, the abundance of alternative concepts makes it difficult to understand the concepts in the subject of chemistry. In relation to the abundance of alternative concepts, there are many studies made in the fields of science education and chemistry education (Çalık and Ayas, 2005; Mirzalar Kabapınar, 2008; Özmen, Demirciođlu and Demirciođlu, 2009). Students who are unable to learn the concepts sufficiently may have difficulty learning relatedly advancing topics. For example, a student who is unable to sit the concepts related to strong and weak interactions about the chemical bonds in his/her mind may have difficulty learning the topics of liquids and solids existing in the advancing units (Ültay, 2014).

Moreover, the fact that the concepts used in chemistry are intangible is the most important of the causes making chemistry difficult (Doymuş, 2007). Since the topic of chemical bonds is a topic which students usually find intangible, it is seen among the topics frequently causing problems (Coll and Taylor, 2002; Levy Nahum, Mamlok-Naaman, Hofstein and Taber, 2010; Özmen, 2004). The abundance of the abstract concepts included in the content of the topic makes it difficult for students to understand the interactions occurring between atoms or molecules (Griffiths and Preston, 1992). Moreover, the topic of interactions between chemical species taught in the continuation of the topic of chemical bonds is also among the topics which students have difficulty learning due to its including too many abstract concepts. Well-understanding of this topic is

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possible through students' having learned such topics as chemical bonds, electron structure of a substance and some atomic properties well.

This topic should be emphasized by teachers via attaching sufficient importance to it starting from science lessons at secondary school and then at high school level, particularly in the 9th grade and it should be taught clearly in most detail by benefiting from the teaching techniques and materials. When it is considered that intermolecular forces exist between all the particles composing a substance, it is of particular importance that the teaching process of the topic should be qualified and understandable. When it is considered that the structure of particles composing a substance determines the magnitude of the intermolecular forces holding the substance together and the solid, liquid or gas state of the substance at a certain temperature (Nivaldo, 2016), it is clear how much learning conceptual knowledge related to weak interactions between chemical species will affect students' horizon in relation to chemical knowledge. However, there are few studies in relation to this subject (Ültay, 2014; Dolu and Ürek, 2018).

Determining students' conceptual knowledge in relation to weak interactions between chemical species and identifying the awareness of the importance of weak interactions will help teachers and researchers make a decision about which points to attach more importance in the teaching of this topic at high schools and universities. For this purpose, in our study, it was aimed to determine the science education 1st year students' knowledge in relation to weak interactions between chemical species and answers were sought to the following questions.

1. What is the knowledge of Science Education students about weak interactions between chemical species?
2. Are the Science Education students aware of the importance of weak interactions between chemical species?

2.Method

2.1. Research Model

The present study is a descriptive study, one of the qualitative research methods. Descriptive studies are carried out generally with the aim of shedding light on a given situation, making evaluations in the direction of standards and revealing possible relationships between events. The essential purpose of this kind of studies is to describe and explain the situation under examination in detail (Çepni, 2018).

2.2. Study Group

The study group was composed of 38 preservice science education teachers in first year at a state university. In the determination of the study group, the purposeful sampling method was used. In the purposeful sampling selection, the criteria considered to be important for the research subject are determined and the sample selected based on these criteria is considered to represent the research population in all respects (Yıldırım and Şimşek, 2013). To ensure the accuracy of the study, first year students of the university who followed similar curriculums in high school were chosen. For this reason, although the study was initiated with 40 students, 2 students from vocational high school graduates were not included.

2.3. Data Collection Tool

For data collection, 4 open-ended questions were developed by the researcher, and in order to ensure internal validity, the questions were presented to two expert academicians in the field of science education; and after the necessary corrections were made, applicability approval was obtained. In addition, the steps implemented are clearly explained and external validity was sought. After these stages, forms with open-ended questions were created. The questions in these forms are specified below.

Scale questions:

- 1- Explain weak interactions among chemical species to your understanding.
- 2- Write down all the weak interactions among chemical species you know.
- 3- Can you explain the weak interactions on an example molecule of your choice?
- 4- Do you think weak interactions among chemical species are important? Why?

The forms with the open-ended questions were given to the students during a period of class time and the students were asked to complete it in the given time. After this stage, 6 students were interviewed with the concern that new information could be obtained in addition to the answers to open-ended questions. Among volunteers who wanted to participate, 6 students were selected for the interview process and were asked the same questions in the forms verbally at the agreed times. Each interview took approximately 45-minutes and the answers given by the participants were recorded as short notes. It was determined that the answers of the participants in the interviews match the answers they gave initially on the

forms. These interviews were particularly beneficial for interpreting the findings of the study.

2.4. Data Analysis

The obtained data was analyzed according to the steps of the content analysis method. The purpose of the content analysis is to gather data, which is similar to one another meaningfully, under codes and themes (Çepni, 2018). Firstly, thoughts and approaches expressed in relation to each question were examined one by one and turned into short codes. During the process of coding the data, the data was worked on and evaluated a few times and opinions were taken from expert academic members. By taking the similarities and the differences between the codes into consideration, the categories were formed and then it was passed from the categories to the themes. The themes were supported via direct quotations. For the reliability of the study, the reliability formula suggested by Miles and Huberman (1994) was applied and the reliability of the study was calculated as 90%.

3. Findings

When the answers given by the students to the first question in the forms were examined, the following findings were obtained and shown in Table-1.

Table 1. Results of the analysis of the first question for defining the concept of weak interaction among chemical species

Codes	f	%	Category	Theme
The attraction force applied by molecules to each other	17	45	Correct definition	Defining the concept
Bonds formed due to interactions between molecules, atoms and ions	3	8		
Van der Waals Forces	3	8	Missing definition	
Hydrogen Bond	2	5		
Electron exchange between atoms	2	5	Incorrect definition	
Ionic and covalent bonds	3	8		
Related to polar and non-polar	2	5		
Atoms forming bonds	2	5		
Elements forming bonds	2	5		

Interaction between metal and non-metal atoms	1	3
Breaking bonds between molecules and forming new ones.	1	3

When the data obtained from the first question of the study were examined: it was seen that 53% of the answers fall into correct definition, 13% into missing definition and 34% into incorrect definition categories.

Some examples of student answers to the first question:

S2: Pulling and pushing forces that the molecules apply to each other.

S5: Attraction forces that take place between two molecules.

S18: Different or same type of atoms to bond with each other.

S19: Something about polarity and non-polarity.

S21: Interactions between elements.

When the answers given by the students to the second question in the forms were examined, the following findings were obtained and shown in Table-2.

Table 2. Results of the analysis of the second question that asks for the names of weak interactions between chemical species

Codes	f	%	Category	Theme
Dipole-dipole	13	34	Suitable example	Name of weak interaction
Ion -dipole	7	18		
London dispersion forces	14	37		
Dipole-induced dipole	1	3		
Ion-induced dipole	1	3		
Hydrogen bond	16	42		
Covalent bond	3	8	Unsuitable example	
Ionic bond	4	11		
Metallic bond	2	5		
Non-polar bonds	1	3		
Polar bonds	1	3		

As the second question of the study, students were asked to write the names of weak interactions between chemical species. When the data

obtained for this question are examined; It was observed that hydrogen bonds (42%), London forces (37%) and dipole-dipole interaction (34%) were written in the appropriate example category. There were very few students expressing dipole-induced dipole and ion-induced dipole interactions. 30% of the answers were categorized as unsuitable.

Some examples of student answers to the second question:

S3: Polar bonds, non-polar bonds

S4: Covalent bonds, ionic bonds

S10: Hydrogen bonds, dipole-dipole bonds

S21: Dipole-dipole, ion dipole, London Dispersion Forces

In the third question of the form, students were expected to explain the weak interactions between the chemical species on example molecules of their choices and the findings obtained were given in Table-3.

Table 3. Results of the analysis of the third question of showing weak interactions between chemical species on example molecules.

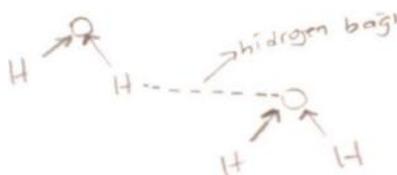
Showing weak interactions between molecules	Correct Representation		Wrong Representation		No Representation	
	f	%	f	%	f	%
With H ₂ O (Hydrogen Bond)	7	18	10	26	15	39
With NH ₃ (Hydrogen Bond)	2	5	3	8	1	3
With HF (Hydrogen Bond)	4	11	7	18	1	3
With HCl (Dipole-dipole)	4	11	12	32	3	8
With Cl ₂ (London Dispersion Force)	-	-	-	-	3	8
With He (London Dispersion Force)	-	-	-	-	3	8

In the third question, in which students were asked to draw weak interactions on example molecules of their choice, H₂O molecule was the most given example by the students (84%) and the hydrogen bond between the H₂O molecules was tried to be shown. It was also stated that apart from the H₂O sample, there may be hydrogen bonding between HF molecules (32%) and NH₃ molecules (16%). The representation of hydrogen bond as a hydrogen atom attached to another atom with high electronegativity, such

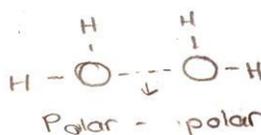
as O, F or N is attracted by another atom with high electronegativity with intermittent lines for the attraction is accepted as accurate. Other representations were accepted as incorrect, only the students who wrote the molecule and did not explain it in the form were evaluated as no representation. As an example of dipole-dipole interaction, HCl molecule was written by students. Polar molecules have electron-rich and electron-poor regions. Dipole-dipole interaction results from electrostatic interactions between partial negative and partial positive poles in molecules (Atasoy, 2018). Students expressing this situation in full were accepted as correct notation, students who only wrote down the molecule without a drawing representation were evaluated as no notation and other impressions were accepted as wrong notation. As for London dispersion forces, no student tried to express their knowledge by drawing but only gave Cl₂ molecule and He atom as examples.

Some examples of student answers to the third question:

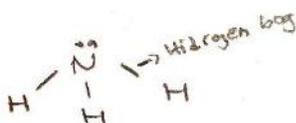
S10:



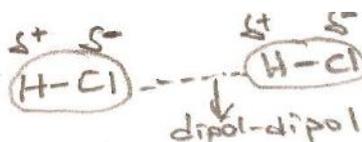
S21:



S15:



S35:



When the answers given by the students to the fourth question in the forms were examined, the following findings were obtained and shown in Table-4.

Table 4. Results of the analysis of the fourth question that evaluates the awareness of the students for the importance of weak interactions between chemical species.

Codes	f	%	Category	Theme
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It affects the physical constants of the molecule	2	5	Aware of its importance	Importance of Weak interactions
It affects the boiling point	2	5		
It ensures molecules are kept together	4	11		
Forms chemical compounds	3	8	Unaware of its importance	
It is important, don't know why	18	47		
No answer	9	24		

As the fourth question of the study, it was questioned whether weak interactions between chemical species are important and students were asked to explain on this subject. When the data obtained for this question are examined; 24% of the students stated no opinion, 47% stated that they are important, but they do not know why and 8% of them gave incorrect answers. In this question, it is observed that only 21% of students know the importance of weak interactions for molecules.

4. Discussion and Interpretation

In this study, with the first three open-ended questions, it was attempted to determine the science education 1st year students' knowledge of weak interactions between chemical species and with the 4th open-ended question, it was attempted to determine the awareness of the importance of weak interactions between chemical species.

When the answers given by the preservice teachers in relation to the analysis of the first question in which they were asked to define the concept were examined, it was observed that only 53% of the preservice teachers could state the weak interactions between the chemical species correctly. In the answers accepted as correct, a great majority of the preservice teachers stated that the weak interactions between chemical species were the intermolecular attraction forces. Only 8% of the preservice teachers used the statement of bonds resulting from interactions in molecules or atoms or ions. 47% of the preservice teachers answered this question incorrectly and generally confused chemical bonds with weak interactions. While chemical bonds are a result of big charges (charges of protons and electrons) interacting in very close distances, intermolecular forces are a result of smaller charges being able to interact in greater distances (Nivaldo, 2016). A result which is similar to the one obtained in the study was reached in a study made by Dolu and Ürek (2018) with biology education students and the finding that the intermolecular weak interactions could not be structured in the minds of the students correctly

was reached. Moreover, in another study carried out by Tan and Treagust (1999) with high school students, it was revealed that a very high percentage of the students had misconceptions about the intermolecular forces.

In the second question addressed with the aim of determining the students' knowledge of weak interactions between chemical species, the students were asked to write the names of the weak interactions. When the answers of the preservice teachers were examined, it was observed that they wrote the hydrogen bond most frequently, and then, in order of frequency, the London forces, the dipole-dipole interaction and ion-dipole interaction were written. The number of the students stating the dipole-induced and the ion-induced dipole interactions is very low. It is observed that most of the students stating incorrect opinions about the names of the weak interactions confused the weak interactions with the chemical bonds. Similarly, in a study made by Ültay (2014) with the 12th grade students, too, it was revealed that the students confused the strong interactions with the weak ones and could not establish the relationships between the concepts of strong and weak interactions completely.

In the third question, the students were asked to show the weak interactions between the chemical species on the sample molecules. The H₂O molecule was the most frequently given example and the hydrogen bond between the H₂O molecules tried to be shown. Water is the main and the most-known compound where the hydrogen bond occurs. Moreover, since the water molecule is covered as an example in the topic of hydrogen bond in high school coursebooks, this is an expected thing. However, in drawings related to the showing of hydrogen bond in the water molecule, only 18% of the students were only able to draw the visual explaining that when a hydrogen atom bound to an oxygen atom with high electronegativity is attracted by the oxygen atom of an adjacent molecule, the hydrogen bond can occur (as it is in the drawing of S10). However, many students, who were not able to draw the correct visual, showed the bond between the oxygen atoms included in two water molecules as the hydrogen bond (as it is in the drawing of S21). Moreover, in a study made by Ültay (2014), too, nearly all of the students showed the strong interactions as the hydrogen bond. Furthermore, Goh, Khoo and Chia (1993) and Peterson et al. (1989), too, reached findings that the students confused the strong interactions with the weak ones. Likewise, the students stating the possibility of the existence of a hydrogen bond between the HF molecules and the NH₃ molecules made similar mistakes and the number of correct demonstrations was very low. Nevertheless, the hydrogen bond occurs when a hydrogen atom bound to an atom with high electronegativity like F, O, N is attracted by a high-electronegativity atom of an adjacent

molecule simultaneously and this bond is shown with dotted lines (Petrucci, 2005).

As an example for the dipole-dipole interaction was given only the HCl molecule and the number of the students who were able to make a correct demonstration was very low. As it is seen in the drawing of the S35-numbered student, the Polar molecules have regions which are rich and poor in electrons. The dipole-dipole interaction results from the electrostatic interactions between the partially negative and partially positive polars in these molecules (Atasoy, 2018). When the drawings are examined, it is observed that the students confused the ionic bond with the dipole – dipole interaction. Moreover, many students wrote only the molecule but did not make a demonstration with a drawing. In the study, while the students did not give any examples related to the ion - dipole interaction, they showed only the Cl₂ molecule and the He atom for the London forces but none of the students tried to explain these forces.

The fourth scale question was addressed to the students to find out an answer to the question “Are the science education students aware of the importance of weak interactions between chemical species. When the obtained data was examined, it was understood that only 21% of the students knew the importance of the weak interactions. The number of the students having the knowledge that these interactions were responsible for many physical properties of substances was very low. A great majority of the students regarded the weak interactions between chemical species as important but did not know the reason of this. According to Griffiths and Preston (1992), the abundance of abstract concepts existing in the content of the topic of chemical bonds makes it difficult for students to understand interactions between atoms or molecules. For this reason, the topic of chemical bonds and intermolecular attraction forces in science education appear before us as a topic which students have difficulty understanding. These topics’ including concepts which cannot be observed directly (electron, bond, interaction), their not having direct practices in daily life and students’ being unable to transform the concepts about this topic from microscopic level into macroscopic level make this topic difficult-to-understand for students (Tan & Treagust, 1999; Uzuntiryaki, 2003).

It is observed that the topic of intermolecular weak interactions emerge in front of chemistry educators as a difficult-to-teach concept and educators should consider this situation in their teaching. It is considered that such methods and techniques as animation, video, multimedia to support this kind of concepts visually by concretizing them will help to teach these concepts (Pekdağ, 2010). Thanks to this study, the points which the students had difficulty understanding tried to be determined and

knowing the conceptual knowledge levels which the students possessed, may provide teachers and researchers to teach the subject with support in the creation of teaching plans.

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BIOLOGY EDUCATION FOR STUDENTS WITH LEARNING DIFFICULTIES DURING THE CORONAVIRUS OUTBREAK: METHODS, APPLICATIONS, ACTIVITIES

*Ufuk Töman**

Introduction

Humanity faced the threat of a virus called COVID-19, which first appeared in Hubei province of China at the end of 2019. With this virus spreading rapidly and threatening the whole world with Coronavirus disease, many countries, especially global countries, had to take so many precautions (Chen *et al.* 2020).

On January 30, 2020, the World Health Organization (WHO) declared a global public health emergency, due to the rapid spread of the outbreak and increase in the number of cases and mortality rates (WHO 2020). As part of the fight against the epidemic, protective measures have been taken to protect social distance, first by the Chinese government and then by the governments of other countries around the world. Among these measures, a number of measures have also been put in place such as 1) prohibition of curfew, 2) quarantine cities, 3) closure of social areas such as cafes, parks and sports areas 4) travel restrictions, cancellations and bans, 5) public permission for individuals with chronic diseases and individuals over a certain age 6) closing schools and 7) imposing curfews for those under a certain age (Yarımkaya and Esentürk, 2020).

Coronavirus disease epidemic caused trauma and anxiety in societies in many countries of the world such as China, Italy, Spain, France, Germany, England, Japan, USA, Iran and Turkey. Although cases and deaths continue in countries, there is no direct vaccine or medicine for the disease (Chen *et al.* 2020). However, in the epidemic process, all health sectors in the world have been mobilized and countries have used all their health infrastructures for the treatment of this disease and stopping the epidemic (Karcıoğlu, 2020). Many countries in the world acted together throughout the process due to a global epidemic. Education is one of the sectors that are most affected by this situation after health. According to the current data of the United Nations, approximately 770 million students in the world have been affected by the closure of schools and universities (Zhong, 2020). Distance learning methods have been used in many countries as the

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fastest and most applicable solution to ensure the sustainability of education.

Distance education started in primary and secondary education levels in Turkey. In addition, it was announced that the 2020 spring semester in higher education will be carried out completely by distance education (YÖK 2020). In the period when education was interrupted due to the coronavirus measures, arrangements were made in the content and applications of the courses in distance education activities in order to realize the learning processes of the students in the healthiest way (Karcıoğlu, 2020). There was also a serious need for support in creating course contents in distance education at universities in Turkey. On the other hand, all learning resources and materials prepared by universities were made available to the Council of Higher Education (CHE) for use in distance education applications. In order to support the content and increase the diversity, common courses were broadcast over the channel allocated to YÖK by TRT (Yamamoto and Altun, 2020). Synchronous or asynchronous distance education methods were used in Turkish universities. Considering the difficulty of synchronous applications in the environment of the epidemic process, especially in associate and undergraduate programs, asynchronous applications are emphasized. Theoretical lessons are planned to be carried out by distance education, and the application studies are planned to be implemented in a compressed calendar at the appropriate time. The measurement and evaluation of the courses carried out by distance education will be carried out by universities at a time convenient for them (Yamamoto and Altun, 2020).

In both normal education and distance education, only activities offered to individuals with normal development should not come to our minds. In educational institutions, there are also individuals with different characteristics and therefore learning disabilities. In order to meet the educational needs of individuals who need special education, there are individualized education programs and special education processes that are carried out in environments appropriate to their characteristics (MEB, 2014). In this process, staying at home for a long time makes it difficult to stay active for children with special needs, as well as individuals with normal development. The education process of children with special needs is disrupted, especially due to closed special education schools and rehabilitation centers. Online learning environments are often not suitable and productive for children with special needs (Yamamoto and Altun, 2020).

Some activities are needed for children with special needs to participate in physical activity (Sözbilir *et al.* 2015). However, exemplary activities should be of a nature that families can apply to their children with special

needs. It is extremely important to advise families of students with special needs about the activity that can be done together at home (Wehmeyer, 2006).

One important issue demonstrated by the pandemic process caused by the COVID-19 virus to the whole world is how biological knowledge and biology education are intertwined with our life and health (Ozkan, 2011). Today's children, as adults of tomorrow, should address biological problems very well. This is possible by learning both general and specific biological (epidemic diseases, nutrition) information. In order to understand daily biological events, it is thought that some information should be transferred to children (Töman, 2018). From this point of view, it is thought that the studies that provide families with exemplary activities and practices that they can do for biology education in order to meet the learning and activity needs of their children with special needs in the limited environment are considered to be beneficial for children with special needs and their families in the Coronavirus epidemic process. The aim of this study is to reveal the benefits of biology education activity on children with special needs and to present examples of biology education methods, practices and activities for students with special needs during the COVID-19 outbreak.

I. The Importance and Benefits of Biology Activities

Children are curious about the objects they see in their environment. To keep their curiosity alive, biology activities should be planned to make them active and attract their attention. Showing some examples of plants, animals, stones in the natural environment to students causes excitement to them and offers opportunities for observation (Narzisi, 2020).



Picture I: Stones, Dried Starfish, Plants in Biology Education Activities

It is necessary to present concrete examples to children in early ages. The easiest and most fun way to do this is through simple activities and applications (Diken, 2009). Instead of telling children how a seed has grown in the soil, it can be active for children to plant a few seeds and

observe how much they grow every day, ferment yogurt with children, play with magnets, and examine the soil with magnifiers.

Doing and experiencing by themselves is the most preferred way for children to learn. Therefore, during the epidemic, families should provide their children with the opportunity to try, predict, mistake, observe, and ask questions during their biology activities at home. For example, when the child sees an ant, s/he may wonder about it and ask what it is fed and how it walks. Parents should answer questions in a way that children can understand, and if necessary, guide some children to feed ant by putting some soil and sugar in a jar (MEB, 2014).

During the activities, families should be in contact with children and ensure that children actively participate in the activities (Yarımkaaya *et al.* 2017). They should prepare suitable environments for children to ask about biological activities. In addition, families should answer children's questions or try to find the right answers with them. It should be known that children can learn many new information by touching, smelling, tasting, feeling and using (Narzisi, 2020).



Picture II: Seed Growth, Ant House, Magnets in Biology Education Activities

Families can use various teaching methods to activate students in their biology activities at home during the epidemic process (Kohli and Writer, 2020). In order for the activities carried out by the mothers and fathers to achieve its purpose, it is necessary to carry out various activities on the subject (Nazirzadeh, 2015). For this, activities can be made simple and fun with dramatization, modeling, puzzles and songs. Thus, the child can be voluntarily participated in the activities. Families should prepare all the materials that will enrich the activities and attract the attention of the children, and carry out the activities in advance and gain experience. In addition, short-term activities should be planned instead of long-term activities, considering that children may be distracted early (MEB, 2014). The benefits of biology education activities applied to children with special needs can be listed as follows:

- ✓ It contributes to their learning by doing and experiencing.
- ✓ It contributes to the development of observation skills.

- ✓ It improves problem solving skills.
- ✓ They learn to use materials related to daily life.
- ✓ It is useful for concept development.
- ✓ It creates a sense of interest and curiosity.
- ✓ They gain sensitive to environmental and natural events.
- ✓ It contributes to the development of reasoning skills.
- ✓ It contributes to the development of self-confidence.
- ✓ It allows them to distinguish similarities and differences of objects.
- ✓ It contributes to the development of the concepts necessary for basic biology and nature education.
- ✓ It contributes to the development of hand and eye coordination.

II. Preparing Materials Suitable for The Features of Biology Education Activities

Materials and equipment to be used in biology education activities for students with learning difficulties during pandemic are very important. Attention should be paid to children's interests, wishes and abilities in determining these materials (Zhu, 2020). The points to be considered in preparing appropriate materials in biology education activities are listed below:

- ✓ Materials should be determined in accordance with children's learning way of by doing and experiencing.
- ✓ Materials should be suitable for children's psychomotor skills
- ✓ Material types should enable children to develop their observation and experimentation skills
- ✓ It should support concrete thinking in children.
- ✓ It should be suitable for the purpose of the event.
- ✓ Materials should not endanger children's safety.

III. Preparation and Application of Biology Education Activities

While choosing activities by family members for students with learning difficulties to carry out at home during the coronavirus outbreak, children's interests and needs should be taken into consideration and activities appropriate to these characteristics should be selected (Courtade *et al.* 2007; Sözbilir *et al.* 2015). Family members should be patient with children in these processes. Clear and understandable questions should be asked and the answers of these questions should not be closed-ended. Children should be given enough time to respond. In the pandemic process, below are exemplary activities that families can do in order to meet the learning and activity needs of their children with special needs in the limited environment. The studies carried out by MEB (2014), Ersoy and Avcı (2001) and Şahin (2000) were benefited in obtaining these activities.

Activity I: Let's examine the freshwater fish

Parents put freshwater fish in an aquarium or lantern. They allow children to feed these animals and examine their movements.



Picture III: Freshwater fish in an aquarium or lantern

Activity II: Let's follow the water turtle

Parents put water turtle in an aquarium. Children are allowed to follow the nutrition, movements and development of this animal.

Activity III: Coloring food and drinks with food dyes

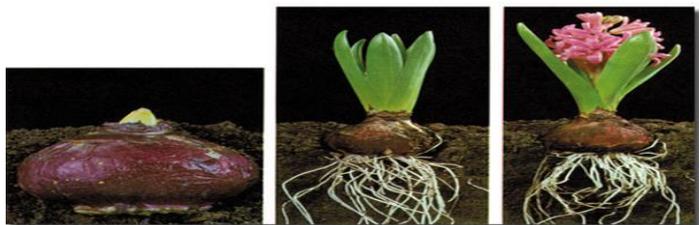
Various foods and drinks can be colored using food dyes. If eggs are boiled with onion peel, they turn red or spinach juice can be added to cake-cookie dough to make green desserts.



Picture IV: Various foods and drinks on which food dyes are used

Activity IV: Seed Sprouting

Mothers and fathers give their child a pot at home. The name of your child is written on these pots. The child sows the seeds s/he chooses into the flower pots, waters and observes the sprouting and growth of his plant.



Picture V: Observing the growth of seeds

Activity V: Melting and non-melting objects

Mothers and fathers put the flour, sugar, salt, stone, sand, ice, water and yoghurt cups that they prepared in their homes in advance on the table. They ask children to put water in yogurt cup. Children put water in yogurt cup and throw ice, flour, sugar, salt, sand and stone into it. They observe and discuss which objects melt and which do not.

Activity VI: Does it float or sink?

Families prepare ping pong ball, rubber ball, wooden cube, coin, sponge, piece of paper, half-filled basin. Children are asked to throw objects into water. Discusses about which objects are floating and which are sinking.

Activity VII: What will the magnifier show us?

Water and sugar are put in one container, and salt and water are put in the other and these are mixed. Dark colored cardboard is placed in front of the children. Children drop these mixes on the background cardboard. Magnifiers are given to children's hands. Children examine how sugar and salt turn into crystal.

Activity VIII: Let's make our own Album

Families decide with the child to decide which of the Plant Album, Flower Album, Pet Album, Sea Product Album, Fruit and Vegetable Albums will be made. Next, materials related to the album are provided. Albums are created using materials.

Conclusions

The transformation of the Covid-19 virus into a pandemic in the world has affected the educational processes in all countries where the epidemic was experienced and led to the use of distance education instead of face-to-face education in order to slow down this epidemic in educational structures. In this process, staying at home for a long time makes it difficult for individuals with special needs to stay active as well as individuals with normal development. The education process of children with special needs

is disrupted, especially due to closed special education schools and rehabilitation centers.

It is extremely important to make suggestions about the activities and practices that students with special needs can do at home with their families. Attention should be paid to children's interests, wishes and abilities in determining the materials and equipment to be used in biology education activities for students with learning disabilities during the pandemic process. While choosing activities by family members for students with learning difficulties to carry out at home during the coronavirus outbreak, children's characteristics should be taken into consideration and activities appropriate to these characteristics should be selected. From this point of view, it is thought that this study, which provides families with exemplary activities and practices that they can carry out for biology education in order to meet the learning and movement needs of their children with special needs, is considered to be beneficial for students with special needs and their families during the coronavirus epidemic process.

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IN THE 21ST CENTURY INDIVIDUAL CAREER PLANNING AND MANAGEMENT FOR THE NEW WORKING AREAS

Vicdan Altınok *

Introduction

We make various choices and make decisions every day in our lives. Some of the choices we make and the decisions we make may change the flow of our lives results in terms of their. One of these critical choices is undoubtedly the choice of profession and career.

In this study aim, What are the expectations of the new generation for the work and business life in the 21st century? What are the business areas needed to meet these expectations? In line with the skills and abilities required by these business fields seeking answers to questions about how career planning and management should be and to contribute to the fact that individuals are able to make healthy decisions in the world of the future by creating career planning and management perceptions towards new business areas required by the age in line with the talents and abilities of individuals.

Career is a thinking ability that individuals generally take the path to pursue to do the job they are interested in, educated and intend to pursue throughout their life. This ability to think determines the goals, objectives and strategies of the activities carried out in order to progress in a chosen business path and to earn more, to assume more responsibility, to gain more respect and prestige. In our age, career preferences are more vital than ever before to have a successful and productive working life. Individuals must be able to manage themselves in order to develop a good career and make the right career choices. Today's business world envisions individuals to learn to manage themselves and their career in order to get out of the from mediocrity and become an elite employee. In this context, individuals should be able to plan and manage their personal careers.

Individual career planning is the a process by which each person can plan their own career goals. In the career planning process, it is important for individuals to review themselves as a whole and evaluate their shortcomings, abilities, knowledge and skills. It should be able to evaluate career options well in line with personal needs and goals by following the career opportunities it can reach inside or outside the institution. Individual career planning begins with self-understanding. Then, it is determined by determining realistic goals and what should

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be done to reach these goals. Individuals should plan to acquire new skills in order to adapt to the terms and conditions of the age and to take part in new fields of work. Especially schools, What should children learn in school? it should be able to answer her question. Because schools are places where the individual skills required by the age will be gained and their ability to make career plans will be improved. Toni Wagner of Harvard Innovation Lab, in today's world to be able for torivalry, He said that he should have critical thinking, problem solving skills, collaboration with individuals of different cultures and levels, mental agility and flexibility, initiative and entrepreneurship skills, ability to access and process information, and the ability to wonder and dream (Wagner, 2020: 205). Owned skills and abilities should not lag behind the features that new professions and fields of work will require. For this, it is necessary to gain new skills by closely monitoring the developments and applications. The way to achieve this is to plan and manage an appropriate career for ourselves.

Managing the career is of the individual's being aware of its location and to predict her future by knowing what the next step will be. Career management is a very important and necessary process for the individual to make appropriate preparations. Career management is an activity that contributes to the planning of career development activities by analyzing an individual's talents and interests. One component of career management is career planning. In the process of starting to progress on this path by choosing a career path for the individual; is the process of determining career goals and the tools to achieve these goals. Career planning and management includes the opportunities to determine the training process, getting to know the business world, enter work, make job changes and rise. Career Management also includes decisions made sometimes by individuals, sometimes by organizations and sometimes as partners. The reason for giving importance to career management in organizations is for the purpose of ensure that it remains the individual's job satisfaction and stay in the organization. Career Management is the process that enables individuals to design and implement goals, plans and strategies that enable them to satisfy their future needs and expectations and to achieve their own personal career goals.

Well planned and executed career programs will provide many benefits to individuals. Effective career management of individuals will also help ensure that professional, technical and managerial skills are constantly equipped. Rooted changes, require employees to review their work life, careers and relationships again among existing jobs. Employees who evaluate their work as a professional need to determine their career plans / strategies well during the radical change process they

are experiencing and at the same time be prepared for sudden career changes.

Moving from this point, the basis of the study; will meet the needs and expectations of different professions and fields of work brought by the new world order, to contribute to the generation's to realize career planning and management appropriate for them.

In the study, firstly considering the features of the new generation Z generation, What are the new professions and working areas in line with the new preferences and social needs created by changing living conditions and technology, to reveal the talents and skills that these fields of job seek in the workforce and the right career planning for the generation to be successful in this process and find a place in the new order and is to draw a path for how career management should also behave.

New Generation Z

Advancing in terms of social life and taking a distance is one of the basic facts known to be possible with the experience and knowledge that a generation will transfer to the next generation. Karl Mannheim (Mannheim, 1998:) has made a comprehensive and systematic research on generations. In the Mannheim study, generations are defined as a community of people with common habits and common cultures and sharing this data. Jean-Claude Lagree (Lagree, 1991:136) concept of generations, defined as communities that lived in the same historical period, were affected by the same events and had the same social identity. At the same time, in necessary to define the emotions of the individuals forming the community of generations, their thoughts and experiences. Generation Z has expression to individuals born in 2000 or later. Their capacity to access information is much higher thanks to technology. Their capacity to access information is higher thanks to technology. Generation Z, which started training at an early age, shows faster mental development. Generation Z, considered as the children of the digital age, is known to have the ability to do many things at the same time. Generation Z, wearable, portable etc. technology has made its products an indispensable part of daily life (Senbir 2004: 27-28; Williams, 2010:273) Generation Z, which is the highest synchronization of the motor skills of human history, is result-oriented, dissatisfied, indecisive and innate consumers. They prefer to live alone. They care about justice, the climate of peace. This generation has a high level of interest in nature and natural assets. Each generation has its own distinctive characteristics, value judgments and attitudes, strengths and weaknesses, apart from existing life and work habits, with their way of perceiving life and different communication styles. This differences

reveals along with the positive and negative aspects of that generation. Briefly, Z generation;

Positive features; They know what they want, they want to work individually and independently, they are honest, they can express themselves comfortably without entering any complex, entrepreneurship aspects and requests are high, a colorful business life where differences are rewarded and adopted, they demand less hierarchy.

Negative features: Infidelity and easy do not give up, being self-centered, being have the expectation of continuous rise, they have wait expect to do innovative and fun Works, being have they hasty and impatient

Within the scope of these features, the generation has some expectations for business life, New professions and jobs required by the age will also have expectations from them. At this point, it is necessary to reach a compromise between the expectations of the employer and the workforce.

Working Life and Z Generation

These characteristics of today's generation can have negative effects as well as positive effects on business areas in the changing world. A study with 3,200 people aged 15-20 in France found that the new generation had different perspectives on business life. The results revealed in this survey; While talking about the company and working life in the company, "very difficult", "very complicated", "boring", "brutal", perceptions are at the forefront and For 36 out of 100 young people, the company says "stress". Approximately 40 percent of the youth see success with a good network. They have not continuous want to stay in working life, a job or a sector. It has been determined that there is a consensus that this generation, which is "I" focused due to their desire for change, has a low sense of loyalty. This generation's impatience and getting bored of everything makes it even more difficult to have them. In "2018 Workplace Trends Report" prepared by Sodexo, which serves in 80 countries worldwide, by compiling many researches and opinions; The Z generation that stepped into the business world since 2017 symbolizes change. The report underlines that the Generation Z, which will replace one of the three employees in 2025, will start a new era in business life with both technology compatibility and dedication to traditions. According to the research by David Stillman; Although the generation Z thinks that the separation in the physical and digital world has disappeared, 84 percent stated that they prefer to interview their bosses personally. Many sector manager will have more screens in their business environment with the increase of Z's in the business world, paper, procedures have been reduced and

flexible working hours and models intensified, many new tasks have emerged, They stated that it would turn into environments similar to movie sets, and project groups, temporary teams, and international team members would be replaced. Leading companies of the world take action with this understanding and start redesigning their office environment from this perspective. They're also trying to organize fun activities in environments where their employees can socialize and feel comfortable in the office.

Today, changes in every field affect our lives in social, cultural, legal, educational and technological fields. These changes affect the social structure, It causes the people who make up the society to change by affecting their value judgments, expectations and beliefs. Instead of employees who are accepting the autorotia without question with who no more expectations in the past, today is more knowledgeable, has more expectations from life, questioning when necessary, comes a new generation workforce with different expectations and who care about taking time for yorself. (Sadullah, 2010).

In a study by Mc Kinsey in 2016, Today, people's work for a fee has revealed that with the development of technology of 45%, it can be done automatically by computer-aided machines. These results suggest that it will increase unemployment in the future. But job opportunities change, transform, deterioration or the only difference in again shaping is needed the required job skills. 65 percent of the jobs that Z generation will work on are jobs that are not currently in the World. Education cannot be planned for a business that does not exist in the world, but an education can be planned to improve the talents and learning skills of individuals.

Talent Revolution research(The Skills Revolution) conducted attended by 18,000 employers from 43 countries made by Manpower Group, terms of employment has for revealed that a bright future waits the youths. According to the research, if one of every five employers (19%) can adapt to the business world of the future, technological developments will increase job opportunities, Six out of every 10 employers (64%), candidate employees have the desired skills, will increase the number of employees if they are if ready to learn, practice and adapt at least it says it will hold the same. On the other hand, the generation Z is seen to expect an “Talent Management” from managers and bosses in business life. The process of building the future of the institution through knowing, managing and developing employees is defined as “Talent management”. Defining talent is the first and foremost step to be successful in talent management. Moving from this point, be able to design the future of today's generation and What skills and abilities should have for new developing job areas? In order to

answer this question, first of all, it is necessary to look at what business areas that will come to the fore in the next century.

Future Professions and Work (Business) Areas

Due to the current state of the world economy, it is very difficult to predict what will happen in the future. However, it is necessary to be able to predict what will happen in the future in order to make a university department preference, start a new business and acquire a new skill. Today, great changes continue to occur thanks to globalization and digital technologies. Within the framework of this change, the professions that will ensure the execution of the works by making more use of technology will continue to be popular. Communities that use the opportunities provided by technology in the most effective way for the 21st century and beyond will have be a strong country and in order to continue its existence, what new professions areas brought about by the change should be determined correctly. In addition, new plans should be made for the workforce to be trained by determining what the knowledge, experience, skills and skills required by these professions should be. Recent developments primarily show that the following the professions will be popular.

One of them is computer engineering. There is still a need for competent and effective people in this field. There is growing demand for successful computer engineers who will offer fast and reliable solutions in the field of finance and investment. Another, astroid mining, the mining sector will also open up to space in the near future. Because mines resources in our world are gradually decreasing. New technologies need manpower trained in many fields such as medicine, production, transportation. Scientific researchers say that the demand for professionals, especially in the fields of chemistry, physics, biology, genetics, mathematics, medicine and engineering, will increase. Fields such as nanotechnology, biotechnology, robotic innovation, 3D printing will need scientists specialized in basic sciences. Organ production, transforming stem cells into tissue with high engineering, producing arms or legs in the laboratory, and pretreatment against diseases with DNA analysis will be possible in the near future. Nano medical, nano technology is already used to repair cells. Moon and space tourism, the ability of ordinary people to travel to space and the moon, .robot design, besides industrial robots, personal robot production is rapidly increasing. Mobile marketing consultancy, that is, as long as the demand for social media continues, consulting sectors that want to reach more people. Due to the general state of the economy today, companies need to work out the needed work instead of hiring salaried staff to cut costs, that is, they started to have it mademake it to freelancers, they can provide services such as new generation

computing, accounting, translation that prefer individual work. Today, there is a great need for translators due to globalization and in the facilitate of communication between countries. Thanks to technological developments, many professions can now be done from home. In such a case, personnel monitoring services will be needed to track employees.

Children have access to smartphones, tablets or computers and as this rate increases every year, it is seen as a business area to produce applications for them. Management area, those who reduce the cost of an organization's activities and increase its performance will promoted faster in their careers in the future. The US Statistical Institute predicts that in 10 years, management staff will be needed in areas such as human resources and event planning. Working areas that enable the use of wind and solar energy in more areas are also gaining importance. Work areas that technology has already started to placement into our lives, if necessary to be indicate under short titles;

Artificial intelligence, a variety of software programs - the Internet, autonomous tools, nanotechnology, renewable energy, quantum computers, biotechnology. There will be in question a number of competencies and skills required by these different areas of study. The areas of study changing and differentiating, requires having some special skills to have a job and progress in career steps.

That The New Generation Ability and Skills

Guthrie Jensen has identified the skills that can provide an advantage in business life in 2020 and beyond. People who want to secure their career in the future should turn to areas where machines cannot effectively solve them, stated that at the beginning, there are skills such as complex problem solving and creativity that could not be transferred to the machines yet.

Besides leading companies in the world, such as IBM, Walt Disney, Electronic Arts, The Institute of the Future, which was prepared with the support of Stanford University experts and which operates under the University of Phoenix, has recently published, In the 'Skills for Future Professions 2020' report, are stated for the stated that ought to change skills and abilities in the future. According to this;

intuition Capability: It can be defined as being able to see the deep meaning and importance behind what is said. In 2020, as the machines more effective in the business fields, people with high intuition capability will come to the fore in critical decision making moments. Feeling in the future will remain important.

Social intelligence: Social intelligence, can be expressed as the ability to connect with other people in a direct and deep way, to understand and adapt to their reactions. Employees with high social

intelligence can quickly evaluate the emotions in themselves and their environment. Social intelligence is also needed for collaborations and establishing reliable relationships and partnerships with large groups of people.

Original and adaptable thinking: This skill, which points to rationalism in thinking processes and to offer solutions, will play an even more critical role in the business world in the 2020s. The Massachusetts Institute of Technology (MIT). Prof. Dr. David Autor has studied how professions have polarized over the past 30 years. Accordingly, job opportunities for white and blue collar people with moderate skills are decreasing. Professor Dr. Autor states that the ability to “adapt to situations” will gain great importance in the future, especially in highly skilled business areas.

Intercultural competence: Intercultural competence skill consists of sub-skills such as language and keeping up with new conditions. Intercultural competence will be one of the most important skills in all sectors by 2020. Every pass day companies, see diversity as an important driving force for innovation. Research shows that working groups of people with different ages, skills, disciplines, working and thinking styles are more innovative.

Numerical thinking: Numerical thinking means being able to summarize a certain number of data and make data-based reasoning. It will not be enough to use Microsoft Office programs in the next 10 years. After a while, human resources will want to see your statistical analysis and numerical reasoning skills in CVs.

New media literacy: It will be win important to evaluate the media contents correctly in 2020s. Organizations will expect their employees to use the resources offered by the new media effectively. Employees of the next generation will be more effective in tasks such as presentation in the business world, as well as reading video forms better.

Being able to move interdisciplinary: Especially including the academy, disciplines are getting closer to each other in to the business world. We are already seeing has become known now new areas such as nanotechnology, protein chemistry, biochemistry and molecular biology now available. While future employees will specialize in at least one area, they will have knowledge in other areas. For this reason, people who are curious and prone to lifelong learning will come to the fore in the 2020s.

Cognitive loading management: This skill briefly points to distinguishing important information and learning how to improve our cognitive functions using a variety of techniques. This skill briefly

points to distinguishing important information and learning how to improve our cognitive functions using a variety of techniques.

Employees in other sectors (Sales and marketing specialist, customer service representative, teacher / trainer, accountant / financial inspector, product designer, Management analyst, Veterinarian, Data analyst, Software developer / Computer programmer, Medical technician / Physiotherapist) should have the following abilities (World Economic Forum).

1. Complex problem solution: The most important way to deal with artificial intelligence is to be able to master creative relationships between industries and bring creative solutions to potential problems.

2. Critical thinking: People who can transform the data meaningfully will become more valuable, especially when different areas are intertwined.

3. Creativity: Based on the quality of randomness and being able to produce something, it will enable you to win both today and in the future.

4. Human management: Robots can have analytical and mathematical abilities, but again, people are needed to understand and lead people.

5. Working in collaboration with others: Effective communication and teamwork skills will also be among the properties of the future.

6. Emotional intelligence: Properties that show that emotional intelligence such as empathy and curiosity are high will be the priority of hiring managers in the future.

7. Interpretation and decision making: To transform a lot of data into meaningful results with data analysis methods and making decisions on this is a skill needed in the information age.

8. Services orientation: Every company needs will be employees who can understand customers' problems and provide them with useful services and support.

9. Bargaining: To be able to negotiate with other organizations and people and produce solutions that benefit both sides, it will be an important feature in the related sectors.

10. Cognitive flexibility: It will be an important requirement for organizations that will take place in more than one industry to adopt different personalities depending on the situation.

What individuals want to do in life by making their self-assessments in the 21st century and they must determine what they can achieve. Thus, they can manage their future correctly and arrange their planning to be happy and successful. In short, people can plan and manage their careers for their future. For this first of all, there are elements to consider in career choices.

Factors to be Considered in the Career Process

People's individual career planning and career goals in achieving besides the characteristics such as success, power, self-realization, the way the individual perceives itself (There is a linear relationship between people's perceptions of themselves and the career path they choose) and the individual's area of interest (there should be a parallel between a career plan and an individual's interests) is important (İbicioğlu, 2011: 38). Also, the socio-economic background and educational background of the child's parents will be effective in determining their career goals. Children begin to choose important role models for their future lives during adolescence. As with many adolescents who choose their parents as role models and listen to career advice there are those who do not choose this situation. Parents' approaches can help children a series discover a range of potential professions and be inspired. Thus, the necessary contribution is provided to work in the job individuals loves and to be a happy employee (İbicioğlu, 2009:521-538).

For the post-training job placement process, people's education is extremely important. It is an important prerequisite to choose a job in parallel with the training received and to do this job with love. The reason why individuals do not choose jobs / professions suitable for their field of education, in fact, it is due to receive education in the field they do not want. After completing her education, the person can realize that she received an education she did not want to do as a profession. At this point, it is revealed how closely the education received is related to the work environment of the individual in the future. In that case when we look at the concept of career, the concept thought to start in business life in times when the individual has not stepped into business life, It is thought that the concept of career started to come into life, especially in the process of choosing and deciding the field that it intends to education. This process is described as discovery in career stages (Aytaç, 1997:165-190). Therefore, it does not start with the entry of the career into the business life of the individual, It would be more accurate to say that it started in the training process.

Although it is claimed that the right profession choice is mostly related to the personal characteristics of the individual It is known that many subjective factors (environmental pressure such as family, friends, etc., social value for the profession, economic reputation of the profession) prevent the individual from making the right choice. Often parents choose the university and faculty they will study on behalf of their children. Parents who take into consideration both their economic opportunities and their social respectability, they can make decisions on behalf of their children regardless of their areas of interest. In societies

where socialization is incomplete, who cannot develop their individual decision making skills, and mostly approves decisions taken on his behalf, they may be insensitive about the choices made on their behalf. Therefore, it is common for individuals who do not object to making choices on their behalf to accept these choices. At this point, the importance of taking the education of the individual's own choices and the profession of their choice becomes clear once again. For a correct choice, it is necessary to determine its criteria, get to know itself correctly and recognize valid professions belonging to its time period.

1. Setting the Criteria

The criteria that individuals should consider when choosing; First of all, individuals should start by choosing the field they are interested in (science / mathematics and technical fields such as medicine, engineering or social fields such as law, business administration, conservatory). The individual can choose which profession wants to do (for example, to be a lawyer) and determine a career goal. However, for a correct determination, one must know himself well.

2. Getting to Know Yourself

The individual should tend to a profession by considering his personality structure, interests and abilities. For example, the individual with a very good human relationship should turn to fields such as public relations, human resources, teacher, should be directed to areas such as, engineering of the person with high technical ability, the conservatory of the individual, whose artistic abilities outweigh, and it would be appropriate for them to be directed to their related sections. The most important theoretical approach that takes into account the concept of personality in the choice of profession; It is the "professional choice model" of Holland. Holland talks about six different personality types and occupational tendency. These; It is realistic, researcher, prone to art, social, entrepreneurial and traditional. Based on this point, Holland has put forward that each profession absolutely fits one of the six personality traits above.

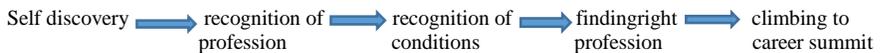
If necessary to exemplify professions according to personality traits; respectively: Individuals with a realistic personality structure have mechanical interest and they value concrete jobs, such as engineering. The researcher individual is interested in fields such as scientist and chemistry. Art-prone individual's fields such as music, theater, advertisement, design. social-prone individual's, to fields such as social working, human resources expertise and teaching. Entrepreneurial personality the individual's to fields such as business management, law, policy. It is put forward that an individual with a

traditional structure also turns to regular and regular business areas such as banking, office and accounting.

3. To recognize the professions required by time

At another stage, individual's should get to know the professions along with getting to know themselves. Preferring the unwanted area based on the preference of the economic income level in the choice of profession, will cause individuals not to be satisfied with their work in the future. In other words, the problems will enter the life of the individual at the first stage of a wrong career choice and career beginning. Therefore, while people are choosing some professions, criteria such as "high economic opportunities" and "popularity" of professions are important traps for individuals to focus on areas of interest. By knowing what you want in this respect, by considering the career goals you want to achieve in the future, choosing make a profession is a very important decision about one's life. In this framework, it should be remembered that it explains career, more money, prestige and professional respectability. Career also explains the possibilities that a person can encounter, splendor, psychological rewards and a better lifestyle (Ataol, 1989:2). Career can be expressed as the order of different or interrelated business activities that provide meaning, order and continuity in human life (Flippo, 1984: 252). Briefly, career is the general flow of the plan that one chooses to follow throughout by working life (Mondy & Noe, 1989: 336). Below is a figure related to the road map of the individual in the career process.

Figure1: Career Roadmap



Source: Career roadmap strategic human resources management Ismet Barutçugil and Career Management the secrets Carolyn Boyes

In this context, it is necessary to answer the question of what should be done for a correct career planning and management.

Career Planning and Management

According to Mike Johnson in his book "Management in the Next Millennium", the first thing young people should learn is, it is their responsibility to settle in a job. One should know who is, her interests and abilities, her strengths and where belongs. After all this, will be able to settle in a suitable career (Aytaç, 2001:180).

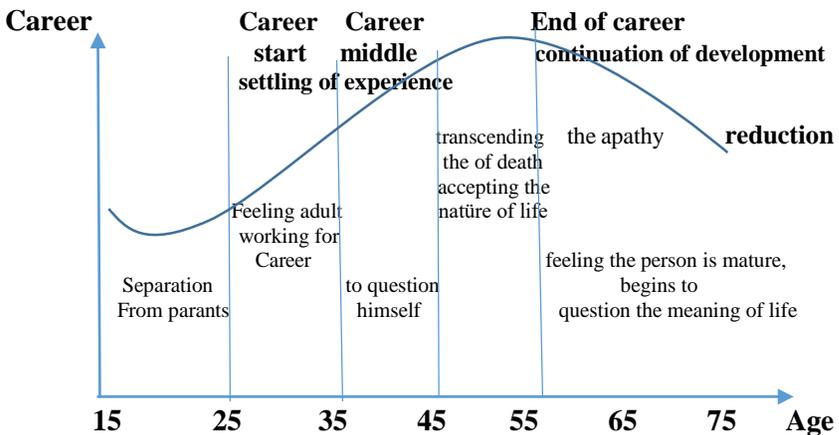
Career Planning

Career planning, which can be expressed as the future use of personal talents, It is divided into two as individual and organizational.

Here emphasized will be Individual career planning. One of the main goals of individual career planning, It is the development of individuals' ability to control their future with the knowledge they have. In this process, the individual evaluates his or her talents, level of knowledge, interests and goals. It also learns how to evaluate the opportunities and alternatives it encounters and how to make effective decisions (Sabuncuoğlu, 2000:149). The main purpose of career planning is to develop the career.

Career planning is not only important for employees who want to be successful in their jobs, but also for institutions that want to gain competitive advantage. Therefore, career planning is an extremely important issue both individually and organizationally. The primary reasons of career planning at the individual level are countable motivating employees to ensure that they do what they do happily and willingly, evaluation of employees according to their abilities, Increasing job satisfaction of employees and enabling employees to recognize their own characteristics.

Figure 2: Career life stages in individual career planning



Source: Robert L. Mathis, John Personnel/Human Resource Management, Sixth, Ed. New York, 1994, pp.287.

Individual career planning is a problem solving and decision making process that aims to establish the most appropriate relationship between the values and needs of employees and their work experience and opportunities. It ensures that employees are happier and more productive in their jobs. It creates employees who can predict their future, know what is waiting for them, determine their purpose accordingly, have high motivation and commit themselves to their job

(Barutcugil, 2016:61). Things to be done in the process of individual career planning (Özel, 2007:52):

1. Individual evaluation; it is a process that helps the individual evaluate skills, potential, strengths and ability to achieve her goals. It is preparing a future plan by keeping in mind the strengths and weaknesses. Self-analyzing individual, must fill the gaps has determined in itself. In other words, it is to see the qualifications and skills required to achieve the goals and objectives. For example, to be perfect in the chosen area, deciding whether any education or a particular course is needed.

2- Evaluation of career alternatives: It will positively affect the future among various education and business alternatives, to evaluate the possibilities to make the right decision.

3-Harmonizing individual characteristics with career alternatives: It is the process by which a person can establish a link between her characteristics and career opportunities.

4-Comprehensive Research for Personal Development: The individual lists his careers after, should conduct intensive research for the required skills and improvements.

5- Determine individual needs and goals: To for achieve the intended career opportunities, is the process of determine goals and creating appropriate plans.

6 - Creating an Action Form: After a person researches the skills and abilities that the job he wants to do, is to state their plans on a form in order to life to realize them. This requires making plans on how the decisions are made and developing. The best way to create an action plan is to create small goals. When these small targets are reached, it can be seen how close it is to the main target.

7-Practices: It is the realization of the preparations required by the planned career opportunities in line with the determined goals.

For generation Z to adapt to changing life conditions in the future, it is not enough to prepare plans considering the personality traits and abilities. Individuals should be prepared for any sudden changes and innovations they may encounter in the future. For this, she should follow the information and developments closely, and be a person who can referrer and manage her plans. Therefore, the supporter of the individual's career planning is career management.

Career Management

Career Management is to implement plans for future lives in line with their goals. Creating these plans as a process is important in achieving the goal. With career management, the individual's mobility in life is ensured and thus they are motivated to the goals they want to achieve. A good career management practitioner can predict in which

position she will be in the future (Kniveton, 2004:564-573). Knowing this depends on what they want to do and increases their motivation. Career Management is the support of the individual's career plan with career development tools. Individual career management requires an approach that clearly takes into account the interests of employees. Providing opportunities for opportunities within this requires creativity (Baruch &Peiperl, 2000:347-366).

Career management should be based on the understanding of career dynamics. This is about how careers progress. By to take on a role related in what people should do in career management, that they use their talents more by expanding or enhancing their roles. This is about how careers progress. By to take on a role related in what people should do in career management, they use their roles more by expanding or by enriching their ability. In this respect, the activities that should be evaluated within the scope of individual career management (Keser, 2002:67).

- Individual vision determination,
- Determine career goals,
- Yeterliliklerin belirlenmesi,
- Follow the innovations in the professions,
- Determining the expectations about the profession,
- Profession determination,
- Researching job opportunities,
- Guiding business relationships,
- Demonstrating behaviors in line with education and career management policies,
- Reviewing the individual and career goals and the current point and taking the necessary measures.

In short, based on the statements made so far, it is seen how important it is for the new generation to plan and manage their careers correctly in their own life processes in order to achieve results that can meet both individual and social expectations. First of all, the necessary strategies for a correct career planning; to be active in career planning, to participate in development activities related to the profession, to determine their needs, values and personal goals, to understand the changes in their private life that affect their professional needs, to look for new opportunities, investigate all options and to benefit from the opportunities provided by institutions. A current practice in individual career management is Networking. Strategies for a successful Networking application are required in individual career management. Some of those; participating in national organizations, conferences, seminars, attracting attention in meetings, attending events, giving and receiving business cards, being a good listener, establishing strong

relationships within institutions, taking notes about the people met, making phone calls to improve relations(Özer, Sökmen & Akçakaya, 2017:128). If an individual wants to take advantage of new job opportunities and have a good job, he / she should be able to analyze his / her personal and professional characteristics and establish the right relationship between them. If the individual does not attach the necessary importance to information, education and development, it cannot be expected to reach the targeted points (Anthony et al., 2010:268).

Conclusion and Suggestions

As a result, there are many issues to consider when choosing a career at an important decision stage about your life. It should not be forgotten that the area / profession to be chosen should not be a job that has disappeared in the near future, and it will create dissatisfaction in the individual in her choice, which has been decided only with economically based expectations. Özden (2002), in “career planning” study, firstly addressed individual development and stated that individuals should do their resource scans well. Trays (2004), in his studies, the concept of career has become the most important concept of today, and in the business world where there is a fierce competition, individuals should have some features in order to gain a good place and earnings, stated that they had to learn certain rules in order to reach their goals in a short time in their career journey.

The different features of the 21st century generation it brought with it new regulations with them in the study areas. It is also called the digital generation or the screen generation because of the features they carry to the Z generation. They perceive technology better than previous generations. They appear to have difficulty accepting authority and limitations. They do not accept hierarchy and want to avoid their standard jobs and rise in their careers. This generation, which gives importance to individuality and is closely intertwined with technology, will prefer to work in institutions and companies that can balance their own characteristics in business life. For this, it is observed that changes in working standards in institutions and organizations. Especially the sectors that reveal the creativity and innovation potential of the generation, create the necessary working environments for this, apply the concept of home office, use their predisposition to technology, are open to innovation and can develop an individual perspective and can work in harmony with this generation will be able to work in harmony. In her study by Taştan (2000), the rapid change of management functions focused on the management systems of companies with this change. Considering the characteristics of the new generation, businesses, institutions, firms etc. it is observed that they have an

attitude and the effects that will cause them to change their business policies (Taş, Demiröz & Küçüköğlü, 2017:1035). Tuncay (2004) In his work titled “We must change our work / career perspective”, not to be behind the age, mentioned that it is important for employers and employees to complete their transition to new career models in the rapidly developing world in order to have a voice in the society. Choosing the criteria and trying to know the individual well and getting to know the professions will be a good career planning process. The selection made after these stages will lead the individual to the right job / profession and will take a new journey that will constitute a very important part of life. Families have a great responsibility especially in this process. It is vital to set the distance between the child and family correctly. The family should be far enough to the child to do own work, and close enough to ask for help when needs it. Where should we be in this process as parents, they should encourage the child to take what they like and take responsibility for their consequences and not pressure for their own expectations. The right thing is not to force them to realize their own wishes, but to allow them to be happy as they wish (Ünalı, 2008:). Zaimler in 2004, focused on career management in terms of businesses and employees with his “Whom is responsible for career management” work has revealed that career management is the responsibility of employees as well as companies.

In the 21st century, young people should evaluate themselves firstly in career development, research their possibilities, make a plan for themselves, take action in line with the plan and evaluate their results. With her research in 2013, Ross stated how individuals can use their ability to be personally successful and for focus on areas that are compatible with their ability. There are differences between some the people want to do and what they can do. This reduces their performance, job satisfaction, motivation. İn this case causes them to constantly change jobs and seek different jobs throughout their careers. In general terms, new generation should have the responsibility to make the right decision considering their own characteristics in terms of their contribution to the national economies as well as their individual happiness. in his work titled "Career in Work Life" in Aytaç and Keser 2017, the low morale, decrease in organizational commitment, in the workplaces and social status in the workplace, changes in career planning and the need for more competent leaders, etc. analyzed new career models resulting from and as a result of these changes. In addition, Sađdıç and Demirkaya (2009) stated that in his “Approaches of university students regarding career development plans” study, career counselors can support young people to get to know themselves about their professional areas of interests and perhaps can use

throughout their lives give them a career method. Thus, besides his family in planning and managing the future of the individual, it is seen that the leader and career counselors are also important.

The key to modern career development is change. With the emergence of technology, home office understanding and e-commerce, the ways of doing business are also reorganized. Here the most important responsibility belongs to the individuals. In this process, individuals;

- * Elective courses should be determined according to the needs of the century,

- * In exams, it should not be limited to the information taught at school, but should focus on competencies,

- * Should contend hobbies, sports, music, art that will support versatility, read plenty of books,

- * Should consider internships and part-time opportunities in different institutions,

- * Should volunteer in civil society organizations and produce project,

- * Take advantage of leadership schools, courses and become a member of clubs,

- * Attend summer camps in domestically or abroad,

Career planning should not be done once in our age; the plan should be reviewed in the process, start with getting to know ourselves, be value-oriented and made by the person. Briefly, it would be appropriate to state the skills that should be acquired in the 21st century under three headings. Learning and Innovation (critical thinking, problem solving, creativity, innovation, collaboration, Communication), digital literacy (information, media, information technology literacy) and career and life (flexibility, compatibility, entrepreneurship, self-management, social and intercultural interaction, creativity, reliability, leadership, responsibility). Career Planning and Management is important in terms of knowing what the current and next step will be, seeing the future and making appropriate preparations for this future.

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SAMPLE SIZE STUDY WITH CHANGE POINT ANALYSIS FOR DINA MODEL IN COGNITIVE DIAGNOSTIC MODELS (CDM)

*T. Oğuz Başokçu**

Introduction

Cognitive diagnostic models (CDM) are among the approaches that have gradually become a widely-used approach in the test development and measurement of cognitive skills. These models are very adaptable to multidimensional analysis at the level of test and the item are a component of multidimensional Item Response Theory (IRT) approach. As the case in IRT models, the size of the sample in which the test is practiced in CDM is a critical factor for the determination of test parameters. In this research, the minimum sample size in parameter invariance was tried to be defined via using DINA, which is one of the most common models among CDM.

DINA Model

DINA (Deterministic Input Noisy and Gate) model which was developed by Haertel (1989) is a latent class analysis that is similar to dichotomic models like Cognitive Diagnostic Model (CDM) (Junker, 1999; Junker & Sijtsma, 2001; MacReady & Dayton, 1977). DINA model uses the item characteristic relationships as a base and it is vital to meticulously choose all the necessary features for answering each item on the test right so as to render the model work (de la Torre & Lee, 2010).

The term ‘feature’ involved in the model can be defined as ‘quality, skill, talent, the presentation of knowledge, and cognitive process’ (Tatsuoka, 2009). Therefore, feature refers to the knowledge and skill an examinee is required to possess in order to give the correct answer to an item on a test.

DINA model can briefly be defined as follows: assuming that X_{ij} is the answer, examinee i gives to the item j , then it is: $i= 1, \dots, I$ and $j= 1, \dots, J$. If the binary feature vector of the examinee is shown as $\alpha_i = [\alpha_{ik}]$,

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for $k= 1, \dots, K$, the situation where the element number k for the examinee is 1, the possession of feature k (mastery) is shown, but where it is 0, the deficiency of the feature k is shown (nonmastery) (de la Torre & Chiu, 2015; Rupp & Templin, 2008). The process of identifying the features the test measures and the association of these features with the item is defined via the Q matrix that is created as j_{xk} and coded as 1-0 (C. Tatsuoka, 2002). The Q matrix of a 4-item test that is represented with 3 features is given in Table 1.

Table 1.

Q Matrix Sample

Items	α_1	α_2	α_3
1	1	0	0
2	1	1	0
3	1	1	1
4	0	1	1

Examining the Q matrix, while α_1 is enough to give the correct answer to the first item, the examinee is required to possess both features α_1 and α_2 in order to give the correct answer to the second item. DINA model is, however, different than the other models in that it is conjunctive (DiBello, Roussos, & Stout, 2006). “And Gate” in the model’s name implies that the operation can be valid only if all inputs are correct. In other words, only way an examinee can give the correct answer to an item is that he needs to possess all features made compulsory for the item.

DINA model calculates two fault parameters: the likelihood of an examinee to give the correct answer to an item by taking into consideration the false possibilities between the possible latent class below the fundamental observed talent and the observed talent. The guess parameter “ g_j ” identified in the model shows the correct positive possibility. This identifies the situation where the examinee gets the answer right without possessing the features required by the item. Another parameter is the slip parameter “ s_j ” that represents the false positive possibility. This parameter calculated for the item identifies the wrong answer of the examinee for the item j despite that it possesses the required features. Below is shown the formulation of s_j and g_j

parameters where the observed reaction of the examinee i is Y_{ij} and its latent class is η_{ij} for the item j .

$$s_j = P \left[Y_{ij} = 0 | \eta_{ij} = 1 \right] \text{ and}$$

$$g_j = P \left[Y_{ij} = 1 | \eta_{ij} = 0 \right],$$

Maris (1999) alternatively defines the g_j parameter as the successful usage of the mental ability to make estimation. Guess parameter in this sense has a different structure from the guess parameter in Item Response Theory (IRT). The g parameter in the model not only refers to the success of an individual to get an answer right despite not possessing the required feature to give the correct answer to the item. But, it also shows the possibility of the examinee of using some features other than the ones that are considered to be critical for giving the correct answer to the item. This also indicates the possibility of erroneous identification of the high g parameter items in Q matrix. Similarly, it points out to the possibility of incomplete features identified in Q matrix in high s parameter calculated for the item.

The item response variance Y_{ij} that was conditionally distributed in DINA model is also connected from α_{ij} to η_{ij} . This is an extension of possibility function of the DINA model, the conditional independence function showing the independence of subjects from one another can be written as follows;

$$L(s, g; \alpha) = \prod_{i=1}^N \prod_{j=1}^J \left[s_j^{1-y_{ij}} (1 - s_j)^{y_{ij}} \right]^{\eta_{ij}} \left[g_j^{y_{ij}} (1 - g_j)^{1-y_{ij}} \right]^{1-\eta_{ij}}$$

In DINA model, students are classified into two basic classes for each item. The first one is the null class that refers to the class of the students who possess none of the expected features. The second one is the full class which defines the class of students who possess all of the features. Therefore, one is classified in the null class if they lack even one feature. The function showing the possibility of an individual possessing all required features to give the correct answer to an item is as follows;

$$P \left[Y_{ij} = 1 | \eta_{ij}, s_j, g_j \right] = (1 - s_j)^{\eta_{ij}} g_j^{1-\eta_{ij}}$$

where P is the possibility of a student possessing all features to give the right answer to an item, η_{ij} is the latent answer identified by α and the quality of the subject number i and the vector of q_j . The order corresponding to the item j in a Q matrix can be shown as follows;

$$\eta_{ij} = \prod_{k=1}^K \alpha_{ik}^{q_{jk}}$$

Tatsuoka (1983) defines $\alpha_i = (\alpha_{i1}, \dots, \alpha_{iK})$ as “knowledge states”, where $\alpha_{iK} = 0$ or $\alpha_{iK} = 1$ depends on whether the student i possesses the quality k ; $\eta_i = (\eta_{i1}, \dots, \eta_{ij})$, j shows the total number of items, and these items help find whether the student i possesses the expected features and it helps identify the Y_{ij} observed point. For a specific feature k , there are 2^k possible knowledge models or latent classes.

DINA model identifies $2k$ number of latent classes by using k number of features as the basis for the to-be-used test. For example, considering that only 3 features are measured in a test, individuals are classified in 8 latent classes ($2 \times 2 \times 2$). The possible classes for 3 features, therefore, are arrayed as “000”, “100”, “010”, “001”, “110”, “011”, “101” and “111”. Whereas the individuals who don’t possess any features are placed in the first class, the ones possessing the first and third features are placed in the seventh class.

DINA model identifies whether an examinee possesses a feature or not based on a possibility-based process. Whether the student is in class 0 or 1 is a possibility value. This value can be redefined by the researcher, however, the threshold .50 is usually used. If the possibility of a student to possess the feature is below .50, he is assigned into class 0; if it is .50 or above, he is assigned into class 1. DINA model does not use the rate of giving correct answers to the items which represent the related feature when making the estimation α on the student. The possibility of a student to possess the feature is linked to the items that represents the very feature (de la Torre, 2008).

Procedure

In this research, the parameter invariance of DINA model and the adequate sample size were identified for the latent class pattern concordance. Three simulation data were created for different conditions along with one real data. The s and g parameters of the data obtained from the study and the s and g parameters of sub-samples of

different sizes obtained from data were compared. The change in the concordance between the universe and the sample parameters was observed to detect which sample size is adequate enough to represent the universe. The relevance rate of the changes between the universe parameter values and the sample parameter values were examined and which sample size is adequate to represent the universe was tried to be identified.

Study Design

In the simulation studies, the number of items and attributes and the size of universe were kept unchanged. The number of items in the generated data were 30 and the attributes were 5 in total.

Simulation study: The same Q matrix was used for all three data that were generated in accordance with the DINA model. This matrix is given in Table 2.

Table 2.
Q-Matrix for the Simulated Data

Item	Attribute					Sum
	1	2	3	4	5	
1	1	0	0	0	0	1
2	0	1	0	0	0	1
3	0	0	1	0	0	1
4	0	0	0	1	0	1
5	0	0	0	0	1	1
6	1	0	0	0	0	1
7	0	1	0	0	0	1
8	0	0	1	0	0	1
9	0	0	0	1	0	1
10	0	0	0	0	1	1
11	1	1	0	0	0	2
12	1	0	1	0	0	2
13	1	0	0	1	0	2
14	1	0	0	0	1	2
15	0	1	1	0	0	2
16	0	1	0	1	0	2
17	0	1	0	0	1	2
18	0	0	1	1	0	2
19	0	0	1	0	1	2
20	0	0	0	1	1	2
21	1	1	1	0	0	3
22	1	1	0	1	0	3
23	1	1	0	0	1	3
24	1	0	1	1	0	3
25	1	0	1	0	1	3
26	1	0	0	1	1	3
27	0	1	1	1	0	3
28	0	1	1	0	1	3
29	0	1	0	1	1	3
30	0	0	1	1	1	3

Sum	12	12	12	12	12
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As seen in Table 2, the distribution of attributes to items (n=12) and the item numbers (n=10) related to attributes one, two, and three are equal in the generated Q matrix. This Q matrix pattern is usually preferred in CDM studies (de la Torre, 2008; Hong, Wang, Lim, & Douglas, 2015; Hou, la Torre, & Nandakumar, 2014; Huo & de la Torre, 2014; Li & Wang, 2015). The number of generated data is kept at 10000. The parameters obtained from these data were accepted as the universe parameter.

Manipulated variables: The item parameters in the research were examined in 3 different conditions as low, medium, and high. The means of the DINA model g (guess) and s (slip) parameters were identified as 0.10 for low, 0.20 for medium, and 0.30 for high parameter conditions (Li & Wang, 2015; Wang, Song, Chen, Meng, & Ding, 2015). These values are generally accepted as the threshold values in the studies where DINA models are utilized. Since g and s parameters in DINA model are error variances, the lower they are, the better the model works. In Low Parameter Condition (Low-PC), g is in the band of 0.108 and 0.091, s is in the band of 0.103 and 0.084. Low-PC represents high level concordance. In Medium Parameter Condition (Medium-PC) and High Parameter Condition (High-PC) data, g and s parameters were generated in a way that they differed between the items. In the generated data, g and s parameters (0.10-0.30) of Med-PC were different than those in High-PC (0.20-0.40). Also, in order for the item attribute number effect of g and s parameters to be examined, the differentiation of the items related to the attributes one, two, and three in g and s parameters were distributed using a pattern. The g and s changes in pattern were matched in Med-PC and High-PC and their parameter means were equalized. This was given in Table 3.

Table 3.
Item-attribute distribution

	item	g	s	Att. item	item	g	s	Att. item	item	g	s	Att. item
Medium Parameter Condition	1	0,09	0,09	1	11	0,11	0,11	2	21	0,1	0,1	3
	2	0,2	0,2	1	12	0,2	0,2	2	22	0,2	0,09	3
	3	0,29	0,29	1	13	0,3	0,3	2	23	0,3	0,1	3
	4	0,1	0,1	1	14	0,1	0,1	2	24	0,1	0,18	3
	5	0,2	0,2	1	15	0,19	0,19	2	25	0,21	0,17	3
	6	0,29	0,29	1	16	0,3	0,3	2	26	0,3	0,2	3
	7	0,1	0,1	1	17	0,1	0,1	2	27	0,1	0,29	3
	8	0,19	0,19	1	18	0,2	0,2	2	28	0,2	0,3	3
	9	0,31	0,31	1	19	0,3	0,3	2	29	0,3	0,29	3
	10	0,21	0,21	1	20	0,19	0,19	2	30	0,21	0,21	3
	mean	0,2	0,2			0,2	0,2			0,2	0,2	
High Parameter Condition	1	0,2	0,2	1	11	0,21	0,18	2	21	0,19	0,19	3
	2	0,31	0,19	1	12	0,31	0,19	2	22	0,29	0,16	3
	3	0,38	0,2	1	13	0,4	0,18	2	23	0,39	0,21	3
	4	0,21	0,31	1	14	0,19	0,29	2	24	0,2	0,25	3
	5	0,29	0,3	1	15	0,3	0,31	2	25	0,31	0,29	3
	6	0,39	0,29	1	16	0,41	0,3	2	26	0,4	0,29	3
	7	0,2	0,4	1	17	0,2	0,41	2	27	0,2	0,38	3
	8	0,29	0,4	1	18	0,3	0,38	2	28	0,31	0,4	3
	9	0,42	0,4	1	19	0,39	0,41	2	29	0,4	0,39	3
	10	0,3	0,3	1	20	0,3	0,31	2	30	0,3	0,32	3
	mean	0,3	0,3			0,3	0,3			0,3	0,3	

As seen in Table 3, the data were generated using a systematic distribution for the purpose of identifying the effect of both conditions in item attribute matches so that the change in the items' parameters that are related to one specific attribute and items related to attributes two and three could be examined and the effect of item saturation could be found. Since all items needed to have the parameter values at 0,1 level in high concordance condition, this distribution was not used in Low-PC.

Analysis

The data generation codes developed by De la Torre was used in ox program. Three data ox programs for 1000 people of the Q matrix that is given in Table 2 were analyzed using the DINA model codes. Later,

each of the samples for 100, 200, 300, 400, 500, 600, 700, 800, 900, and 1000 people were taken 100 times from these 3 data randomly and without replacement. 100 data ox programs that were taken randomly for 10 different sample sizes from three simulation data were analyzed using the DINA codes. The same analyses were also done for real data. For each data, 4 x data x 100 replication data x 10 sample size = 4000 analyses were done.

For the mean of the parameter values of 100 replication data that were created for each sample size and for each prediction for the comparison of parameter values of data for 10000 people chosen as the universe parameter, bias and root mean square error (RMSE) values are computed as

$$Bias(E(\zeta)) = \sum_{r=1}^R (E(\zeta_r) - \zeta)/R$$

$$RMSE(E(\zeta)) = \sqrt{\sum_{r=1}^R (E(\zeta_r) - \zeta)^2/R}$$

where ζ and $E(\zeta)$ were the generating value and the estimated parameter from the posterior distribution (Huang & Wang, 2014). By doing so, the differentiation levels of item parameters identified for different sample sizes from the universe parameter were found. Later, the distributions of Bias and RMSE values that were identified for each sample size separately were accepted as a time-order distribution and with the change point analysis parameter differences were examined to see which of them demonstrated a meaningful change.

Change point analysis

Change point analysis is the process of detecting distributional changes within the time-ordered observations (James, 2015). As the sample size got bigger, two different change point analyses were used to detect the point where the difference between the sample parameters and universe parameters were meaningful. CPM package developed for R and change point analysis package developed by Taylor were used (Ross, 2015).

Let x_t denote the t^{th} observation that has been received, where $t \in [1,2,\dots]$ (Ross, 2015). In CPM approach, adopting a two-sample hypothesis testing procedure, the existence of possible multiple change

points are tried to be found with sequential change detection for each observation added in time.

When a new observation x_t is added, CPM approach calculates D_t value which uses the batch methodology via keeping the spaces between x_1, \dots, x_t unchanged. It selects the change point it identified for the situation where it is $D_t > h_t$ for the related threshold. If there is no change point, the procedure continues by using a new observation x_{t+1} and comparing D_{t+1} and h_{t+1} . In this sense, the procedure is made up of hypothesis tests that iterate at intervals.

As h_t in sequential setup is chosen assuming that the possibility of the Type 1 error to occur stays unchanged through time, null hypothesis doesn't change:

$$P(D_1 > h_1) = \alpha$$

$$P(D_t < h_t | D_{t-1} \leq h_{t-1}, \dots, D_1 \leq h_1) = \alpha, \quad t > 1$$

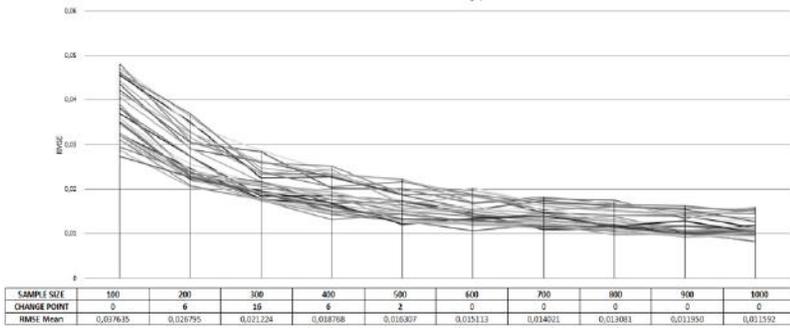
In this case, no change points are accepted to form (Ross, 2015).

The iteratively performing Change-Point Analysis program procedure uses a combination of cumulative sum charts (CUSUM) and bootstrapping to detect the changes (Taylor, 2000). CUSUM charts are constructed by calculating and plotting a cumulative sum based on the data. Let x_1, \dots, x_t represent the data points. From this, the cumulative sums S_1, \dots, S_t are calculated. Then, an estimator of the magnitude of the change S_{diff} determined. Later, the change points are determined with bootstrap analysis (Taylor, 2000).

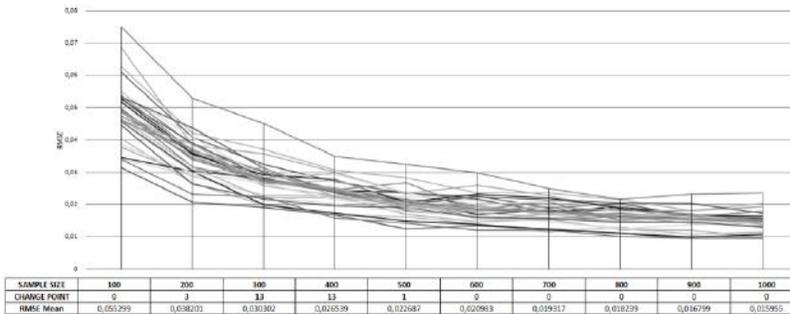
Findings

The change points of RMSE values related to the differences between the universe parameters and the sub-group parameters of different sample sizes were found in order to determine the optimal value of the adequate sample size for CDM models. The graphs showing the changes of RMSE values demonstrating the difference between the universe parameters and g and s parameters – which were computed using the DINA model- of samples of different sizes that were chosen randomly for Low-PC, Medium-PC and High-PC whose Q matrix and parameter values are given below.

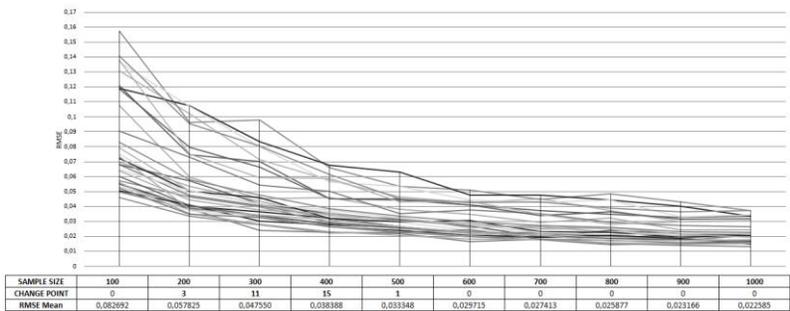
Pattern 1. RMSE change point results for g parameter of items in Low-PC condition



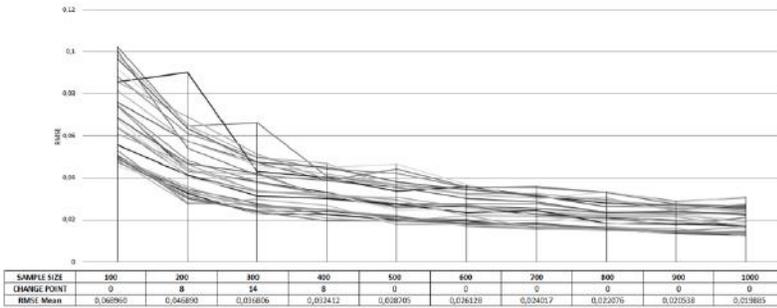
Pattern 2. RMSE change point results for g parameter of items in Med-PC condition



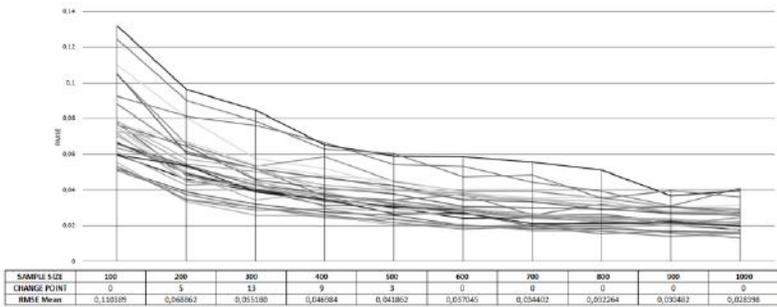
Pattern 3. RMSE change point results for g parameter of items in High-PC condition



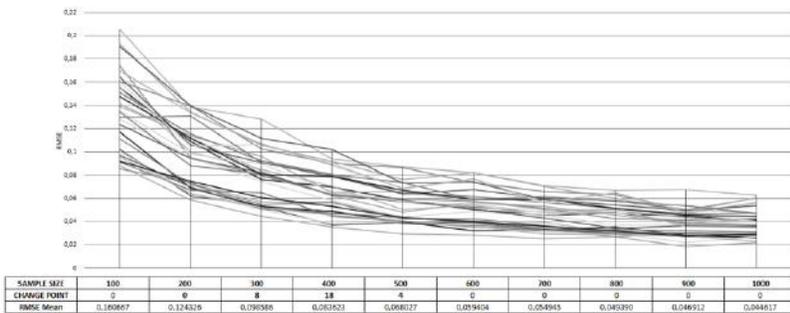
Pattern 4. RMSE change point results for s parameter of items in Low-PC condition



Pattern 5. RMSE change point results for s parameter of items in Med-PC condition



Pattern 6. RMSE change point results for s parameter of items in High-PC condition



Patterns 1, 2, and 3 demonstrate the parameter change curves for low, medium, and high-PC conditions respectively. The lines in the graph represent the RMSE values that show the difference between the items and the universe parameter in their own sample sizes. The table below the graph, we showed where these curves have change points. In patterns 4, 5, and 6, the changes in s parameters of the same analyses are shown.

When Pattern 1 is examined, it is seen that in consequence of change point analysis, 4 out of 30 items in Low-PC in the sample for 200, 18 items in the sample for 300, 7 items in the sample for 400 and 1 item in the sample for 500 had change points. The 60% of the sample for 300 had change points. This can be interpreted that the g parameters of the sample's items that came after the sample for 300 showed no clear difference from the universe g parameter. A similar situation is present in the analyses done for the s parameter in pattern 4. As seen in pattern 4, the RMSE value of the s parameter of 8 items in the sample for 200, 14 items in the sample for 300, and 8 items in the sample for 400 showed change points. When all patterns are examined, the frequency for the items to have CPs was usually n=300-400.

The Table 4 summarizes the change point results of the analysis results for the Low-PC, Medium-PC, and High-PC:

*Table 4.
The change point analysis results and rates for different conditions*

sample size	Low Par. Condition				Med Par. Condition				High Par. Condition				Mean
	g		s		g		s		g		s		
	cp	%	cp	%	cp	%	cp	%	cp	%	cp	%	
100	-	-	-	-	-	-	-	-	-	-	-	-	-
200	6	20,0	8	26,7	3	10	5	16,7	3	10	-	-	13,9
300	16	53,3	14	46,7	13	43,3	13	43,3	11	36,7	8	26,7	41,7
400	6	20,0	8	26,7	13	43,3	9	30	15	50	18	60	38,3
500	2	6,7	-	-	1	3,3	3	10	1	3,3	4	13,3	6,1
600	-	-	-	-	-	-	-	-	-	-	-	-	-

The sample sizes for the guess parameters in Low-PC yielded similar results as the universe parameters: 73.3% for 300, 93.3% for 400 and 100% for 500. A similar case counts for s parameters as well. The slip parameter in Low-PC where n=400 always yielded similar values as the universe parameter. When all conditions are examined, it was observed that only the 6.1 % of items had change points where n=500. In DINA model analysis, where the sample size is 300, the

parameters of the items were found 55.6% concordant with the universe parameter. In the case where the limit for the sample size value is accepted as 400, it can be concluded that average of 93.9% for all analyses, item parameters cannot have different values on a meaningful level than the universe parameters.

A critical point worth noting in change point analyses is that the items had only one change point. This suggests that the difference between the values observed after the change point is not meaningful. As can be inferred from the patterns, no meaningful difference between the RMSE values of items was observed. Therefore, this seems to reveal the adequacy of the sample size after the change point.

In Table 5, the mean, median, standard deviation, and total values of the RMSE values according to the sample sizes for three conditions. As seen in Table 6, the differentiation levels of g and s parameters from the universe value decrease in all conditions where the sample size is between 300-400. The decreased differentiation of RMSE changes can be seen clearly particularly when the differences between the statistics of RMSE values $n=200$ and $n=400$ were compared with the differences between the values $n=400$ and $n=60$

Table 5
The mean, median, sd and sum values of RMSE values for different conditions.

Sample Size	100	200	300	400	500	600	700	800	900	1000	
	Mean	0.0376	0.0268	0.0212	0.0188	0.0163	0.0151	0.0140	0.0131	0.0119	0.0116
Median	0.0365	0.0244	0.0208	0.0184	0.0158	0.0148	0.0135	0.0123	0.0113	0.0110	
Stand Dev.	0.0063	0.0050	0.0034	0.0035	0.0029	0.0027	0.0022	0.0023	0.0022	0.0022	
Sum	1.1291	0.8039	0.6367	0.5630	0.4892	0.4534	0.4206	0.3924	0.3585	0.3478	
Small Par. Condition	Mean	0.0690	0.0469	0.0368	0.0324	0.0287	0.0261	0.0240	0.0221	0.0205	0.0199
Median	0.0680	0.0434	0.0357	0.0318	0.0274	0.0261	0.0230	0.0214	0.0205	0.0185	
Stand Dev.	0.0183	0.0150	0.0106	0.0080	0.0082	0.0067	0.0065	0.0061	0.0054	0.0057	
Sum	2.0688	1.4067	1.1042	0.9724	0.8612	0.7838	0.7205	0.6623	0.6161	0.5965	
Medium Par. Condition	Mean	0.0486	0.0345	0.0276	0.0241	0.0207	0.0187	0.0177	0.0163	0.0152	0.0146
Median	0.0479	0.0354	0.0274	0.0242	0.0206	0.0182	0.0173	0.0164	0.0157	0.0145	
Stand Dev.	0.0100	0.0066	0.0055	0.0044	0.0041	0.0040	0.0035	0.0032	0.0031	0.0031	
Sum	1.4568	1.0341	0.8276	0.7230	0.6216	0.5595	0.5297	0.4889	0.4567	0.4366	
Large Par. Condition	Mean	0.0764	0.0556	0.0461	0.0399	0.0352	0.0315	0.0288	0.0273	0.0242	0.0239
Median	0.0738	0.0532	0.0430	0.0367	0.0324	0.0288	0.0258	0.0252	0.0229	0.0221	
Stand Dev.	0.0209	0.0159	0.0140	0.0115	0.0102	0.0096	0.0092	0.0078	0.0063	0.0070	
Sum	2.2921	1.6668	1.3836	1.1955	1.0554	0.9462	0.8655	0.8189	0.7262	0.7182	
RMSE-G	Mean	0.0709	0.0502	0.0394	0.0341	0.0293	0.0266	0.0238	0.0222	0.0208	0.0197
Median	0.0636	0.0430	0.0362	0.0307	0.0263	0.0239	0.0214	0.0203	0.0191	0.0171	
Stand Dev.	0.0222	0.0182	0.0125	0.0104	0.0088	0.0080	0.0067	0.0068	0.0057	0.0058	
Sum	2.1284	1.5059	1.1817	1.0233	0.8790	0.7992	0.7138	0.6668	0.6239	0.5918	
RMSE-S	Mean	0.1342	0.0969	0.0785	0.0656	0.0555	0.0533	0.0469	0.0441	0.0392	0.0392
Median	0.1347	0.0966	0.0807	0.0632	0.0571	0.0535	0.0466	0.0465	0.0384	0.0400	
Stand Dev.	0.0343	0.0264	0.0224	0.0185	0.0153	0.0157	0.0129	0.0128	0.0110	0.0116	
Sum	4.0262	2.9057	2.3540	1.9675	1.6649	1.5996	1.4067	1.3237	1.1761	1.1757	

Findings related to the item-attribute relationship

Table 7 demonstrates the findings obtained from the examination of item attribute relationships. Items 1, 2, and 3 were correlated with an attribute. As explained the procedure section (see Q matrix), the first 10 items were correlated with only 1 attribute, the next 10 were correlated with 2 attributes, and the remaining 10 items were correlated with 3 attributes; see Table 6 displaying how the change in RMSE values occurs in attribute-item relationship.

Table 6
The RMSE values of item-attribute interaction.

		RMSE Means					
		Guess Parameter			Slip Parameter		
	Sample size	1 Att.	2 Att.	3 Att.	1 Att.	2 Att.	3 Att.
Med-PC	100	0,074	0,050	0,042	0,125	0,106	0,100
	200	0,052	0,034	0,029	0,050	0,069	0,088
	300	0,038	0,028	0,024	0,038	0,053	0,074
	400	0,034	0,023	0,022	0,033	0,047	0,061
	500	0,029	0,021	0,018	0,030	0,041	0,055
	600	0,027	0,020	0,017	0,026	0,037	0,047
	700	0,024	0,018	0,016	0,024	0,034	0,045
	800	0,024	0,017	0,015	0,023	0,031	0,042
	900	0,021	0,015	0,014	0,022	0,030	0,040
	1000	0,021	0,015	0,012	0,020	0,029	0,037
High-PC	100	0,126	0,067	0,055	0,115	0,160	0,206
	200	0,087	0,049	0,038	0,085	0,126	0,162
	300	0,071	0,041	0,031	0,067	0,098	0,131
	400	0,055	0,034	0,026	0,056	0,081	0,114
	500	0,047	0,030	0,024	0,046	0,066	0,093
	600	0,043	0,026	0,021	0,039	0,059	0,080
	700	0,039	0,023	0,019	0,038	0,055	0,072
	800	0,037	0,023	0,018	0,033	0,049	0,066
	900	0,033	0,020	0,017	0,032	0,047	0,062
	1000	0,032	0,020	0,016	0,030	0,044	0,060

As seen Table 6, the changes of g and s parameters are exactly the opposite of one another. While the number of g parameter attributes increases, it yields similar results to the universe, whereas s parameter moves away from the universe parameter with a single exception. The same change can be observed for both Med-PC and High-PC.

Findings related to real data

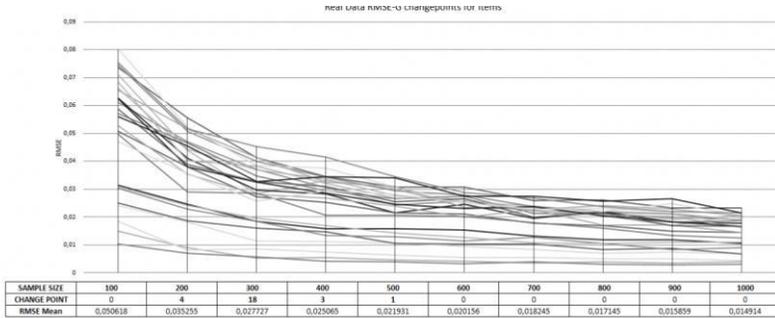
In the real data study of the research, data for 7009 individuals from countries that were picked randomly from the TIMSS 2011 grade 8 application were used. The gain area specified according to the TIMSS framework was taken into consideration to determine the real data Q matrix. The test used in the real data study is made up of 26 items and 4 attributes. Adopting a similar procedure with the real data simulation studies, $n=100, 200, \dots$, and 1000 samples were taken 100 times for each from the universe randomly and without replacement. The analyses were done on these replications. According to the analysis results, the g and s parameters obtained from the real data and the se values of them are given in Table 7.

Table 7.
The s and g parameter values and standard errors for the real data

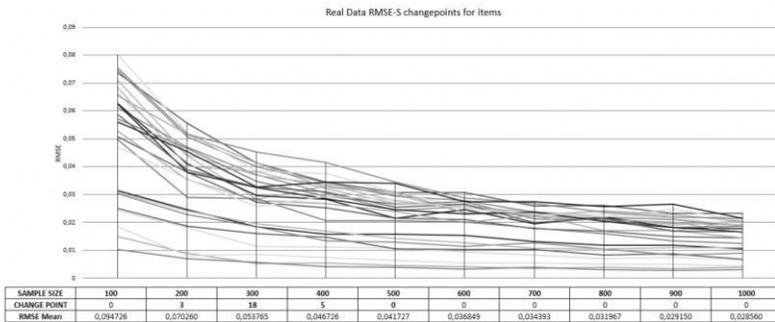
Item	Real Data				Item	Real Data			
	g	g/se	s	s/se		g	g/se	s	s/se
1	0,38	0,008	0,11	0,007	14	0,17	0,006	0,29	0,01
2	0,28	0,007	0,46	0,012	15	0,14	0,006	0,39	0,01
3	0,42	0,007	0,05	0,006	16	0,29	0,007	0,45	0,01
4	0,05	0,003	0,14	0,009	17	0,08	0,004	0,69	0,011
5	0,03	0,002	0,31	0,012	18	0,58	0,007	0,06	0,006
6	0,01	0,001	0,48	0,012	19	0,01	0,002	0,69	0,011
7	0,01	0,001	0,68	0,011	20	0,15	0,006	0,25	0,01
8	0,03	0,003	0,62	0,011	21	0,13	0,005	0,41	0,011
9	0,33	0,007	0,24	0,009	22	0,22	0,006	0,18	0,009
10	0,23	0,007	0,16	0,008	23	0,05	0,004	0,48	0,011
11	0,33	0,007	0,21	0,01	24	0,27	0,007	0,21	0,01
12	0,55	0,008	0,05	0,005	25	0,08	0,005	0,56	0,011
13	0,6	0,008	0,09	0,006	26	0,06	0,004	0,65	0,011
Mean						0,21		0,34	

As seen in the table, the mean for the g parameter of the real data is 0.21 and the s parameter mean is 0.34. This signifies that the test is between medium and low concordance.

The graphs below show how the g and s parameters of the RMSE values of the real data are affected by the sample size on the item level. For which sample size the item has a change point can be seen right beneath the Graph 7.



Pattern 7. The RMSE change point results for g parameter of real data items



Pattern 8. The RMSE change point results for the s parameter of the real data items.

Results similar to the simulation studies were observed when the graphs were examined. When changes on item level for the g parameter are examined, change points were seen 4 times when $n=200$, 18 when $n=300$, 3 when $n=400$, and 1 when $n=500$. When the sample size is 300, the 83% of items and when it is 400, the 98% of items yielded similar results with the universe parameters. The RMSE values related to the real data parameters had only one change point.

The descriptive statistics related to real data are given in Table 8.

Table 8
The mean, median, SD and sum values related to RMSE values of real data parameters

Sample Size	Real Data							
	RMSE-G				RMSE-S			
	Mean	Median	Stand. Dev.	Sum	Mean	Median	Stand. Dev.	Sum
100	0,00323	0,00111	0,00548	7,598	0,01006	0,00379	0,01898	24,803
200	0,00152	0,00052	0,00260	3,746	0,00540	0,00210	0,00936	13,877
300	0,00092	0,00029	0,00167	2,331	0,00309	0,00115	0,00497	8,021
400	0,00075	0,00023	0,00130	1,910	0,00235	0,00090	0,00374	6,118
500	0,00057	0,00017	0,00097	1,461	0,00186	0,00066	0,00296	4,837
600	0,00048	0,00014	0,00082	1,227	0,00145	0,00055	0,00238	3,774
700	0,00039	0,00012	0,00066	0,998	0,00127	0,00046	0,00216	3,312
800	0,00034	0,00010	0,00060	0,891	0,00110	0,00039	0,00182	2,863
900	0,00030	0,00008	0,00053	0,766	0,00091	0,00036	0,00151	2,367
1000	0,00026	0,00007	0,00046	0,673	0,00088	0,00033	0,00140	2,279

Table 8 shows that the change rate of mean, standard deviation, and sum values decrease after n=300, 400 values for both g and s parameters. This is in line with change point analyses and simulation studies.

Discussion

The aim of the research was to detect the most suitable sample size that shows the parameter invariance by utilizing the DINA model, which is the most commonly used one among CDM. As was found, n=400 can be accepted as the optimal size for different conditions.

As in all other CDM analyses, in DINA model, the sample size is an important variant for the parameters chosen by the model, the respondent talent score or their class. In all IRT-based models, not being able to find a specific sample size threatens the reliability of the results. For this reason, the researchers and examiners working on CDM models, especially the DINA model, have an approximate measure about the adequate sample size is a must for the sake of field studies. The effect of sample size in this research was examined on models ranging between high and low concordant ones. The findings demonstrate that n=400 value for sample size is adequate for parameter invariance independent of the model concordance. Inadequate concordance levels of guess and slip parameters eliminated them from the research as they are inapplicable for the parameters obtained for high models. Therefore, the reason for low

concordance is not the size of the sample in studies where n is higher than 400.

The findings obtained from this research are believed to be critical particularly for real data practices. While it is relatively easier to manipulate the sample sizes in simulation-based studies, there is no clear agreement on the sample size to adopt for real data. Literature, in general, having a similar attitude as in the IRT model, advises the sample size to be big.

Another thing to consider as part of the research is the item-attribute effect. In simulation studies, the changes of the sample size of items related to one trait and items related to two or three traits were also examined. According to the analysis results, as the number of the attributes related to the item increased, the change in guess parameters decreased but the change in slip parameters gradually increased. It is the proof that as the number of traits related to an item increases, slip parameters are highly affected by this. It is highly expected when the conjunctive structure of the DINA model is taken into consideration.

The basic limitation to the research that the analyses were conducted using the DINA model only. Therefore, there is a chance for the findings obtained from different models of sample size to differ. However, as DINA model is more of a conjunctive aspect compared to other models, the results obtained here can be of similar nature with other models. Aside from these, the numbers of items and attributes were kept unchanged for the tests. Here the effect of the number of attributes and items should be examined in order to obtain more accurate information on what the adequate sample size is.

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USING PODCAST TO DEVELOP LISTENING SKILLS ON TEACHING TURKISH AS A FOREIGN LANGUAGE

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Introduction

In recent years, language learning process is not limited to the books; rather, computer technology is used to develop the quality of education and learning foreign language. In Computer Assisted Language Learning (CALL), teachers can challenge the traditional teaching and learning methods by incorporating computer technology into language teaching process (Sayadi & Mashadi, Heidar, 2018, p.73).

In the new world setting, foreign languages become an indispensable part of variable context. English tops the list of the most popular foreign languages but there are also other languages which are widely spoken. Turkish is one of them. While it has a large number of native speakers around the world, a considerable number of people have started to learn it recently. So the studies on Turkish as a foreign language have started to appear. At the beginning, these studies seem like being instructed mostly with traditional methods which hang more on reading and grammar; however, especially in the last decade, skills-based teaching methods are seen at teaching Turkish as a foreign language. This may be explained with the dominance of communicative methods in the teaching environment.

Besides, technological developments are very particular about the defining methods in education in the last decade. Among the skills described through learning a language as a foreign language, listening comes first although it was ignored initially at the early approaches of language teaching. Listening is the ability to accurately receive and interpret messages in the communication process and it has a great impact on learning and comprehension of foreign language (Sayadi & Mashadi, Heidar, 2018, p.73).

Contrary to the traditional instruction of teaching, listening is the beginning step of learning a language as described to be one of the receptive skills. For example, in a research conducted to teach English in the Saudi context, it was explained that learners cannot develop their listening skills through traditional method (Al-Bargi, 2013, p.3581). There are many studies on teaching listening skills but recently the use of

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podcasts is very common in language learning-teaching and this might be reflected to teach Turkish as a foreign language.

Taking advantage of current technological advances, podcasts provide timeless learning facilities without place limitation. Unfortunately, there are not a wide range of studies on podcasts to teach Turkish as a foreign language. On the other hand, Common European Framework of Reference for Languages (CEFR) has been declared to set standards for teaching foreign languages. CEFR comprises of several standards dividing described skills and goals into levels varying from A1 to C2. These standards have common aspects for all languages and teaching Turkish might be implemented in reference to CEFR. CEFR is also a reflection of the last trends which focus on communicative purpose on languages.

Listening skill is neglected both in mother foreign language teaching and limited activities are applied in the classroom. Especially in traditional classrooms, listening activities are limited and neglected. In order to develop productive skills, attention should be paid to developing listening skills with the help of technology. The use of technology among youth is widespread; so podcasts should be used in language learning and teaching. The use of podcast in Turkish as a foreign language will definitely help the comprehension of Turkish language learning. Thus, this study aims to develop both listening and speaking skills of Turkish language learners through podcasts by developing podcast activities with reference to CEFR. Twelve activities have been developed with four podcasts on B2 level.

Podcast

When the definitions were checked in the literature, Podcast is basically described as a set of portable listening items which can be carried through technological devices. The word "podcasting" derives from blending the words iPod and broadcast (Nataatmadja & Dyson, 2008, p. 17). Podcasts are usually in the form of audio or video files, and they have very important function to improve learners' listening and speaking skills. It has been emphasized that podcasts are very easy to reach through applications or internet sources and they provide autonomy for students and teachers to create their own audio recordings. This feature of podcasts is so efficient that it boosts a timeless channel to listen and limitless production of new materials.

McGarr (2009, p.312) described podcast as "substitutional, supplemental and creative". It means that podcasts might be used to view delivered verbal statements, to supply available materials such as text book with additional support and to create new materials for classroom use. By all means, podcast production has developed at an impressive way. The

number of Podcasts has increased rapidly and it has become easily accessible for everyone (Nataatmadja & Dyson, 2008, p.18). Podcast is very convenient via Web tools and sources on Internet, even students might create their own podcast.

Podcasts provide freedom for listeners to learn any time or anywhere, which makes students more interested in it. The learning process might be carried out independently from school or instructors. Learners can listen to educational recordings while travelling, sitting in their rooms or doing any activity they choose.

Podcasting is one of the powerful, emergent technological media that has been used in education for many years. Language learning has been recognized as one of the fields about to get help from the rapid development in podcasting. Research studies on podcasting have already acknowledged its potentiality and have documented many evidences that podcasts can greatly help develop learners' language skills, especially in developing learners' speaking and listening skills (Ashton-Hay & Brookes, 2011; O'Bryan & Hegelheimer, 2007 as cited in Hasan & Hoon, 2013, p. 128).

The other feature of podcasts is their closeness to real life. Authenticity might be considered as an important standard on podcasts because it will bring the real life into language teaching. Kilickaya (2004) describes authenticity as "exposure to the real usage of the everyday life language and how native speakers use for their daily lives purposes". In other words, it is the reflection of living and socially developing language in communities. Due to having real-life needs, learners need to be motivated by the introduction of authentic texts in recordings. And also Kılıçkaya (2004) declares that "using authentic materials increases and develops learner's motivation because such materials offer students a feeling that they are learning the real language". According to Belaid & Murray (2015,p.28), there are many sources of authentic content like movies, YouTube, newspapers and novels but the most efficient one is Internet.

At this point, the reflections of Internet on language teaching should be emphasized. Another crucial reflection on language teaching has occurred via Common European Framework of Reference for Languages (CEFR). It aims to set a common framework to shape curriculums, textbooks, exams or briefly standards for languages in European countries. This declaration explains dearly what learners need to learn to use any language in a communicative way and what skills or knowledge learners need to have to be capable of using language efficiently. CEFR (2001, p.24-27) describes language capabilities in levels with skills and cultural aspect of language.

Despite having a number of positive effects on language teaching, podcast may also have negative effects. At first, it requires a period of time which might be restrictive for some practitioners or it might decrease potential interactions amongst students in the class. Yaman (2016, p.65) has a list of pros and cons to show potential positive and negative reflections on education by Podcast.

PROS	CONS
<ul style="list-style-type: none"> ✓ Motivating ✓ Appeals to digital natives ✓ Omnipresent-no time and place restriction ✓ Enhances learner autonomy ✓ Both online and offline ✓ Contributes to the development of listening and pronunciation skills ✓ Also supports other language skills ✓ Limitless resources ✓ Authentic (native use of language) ✓ • Involves both teacher and student 	<ul style="list-style-type: none"> ✓ Digital divide ✓ Digital immigrant teachers ✓ Will be of limited use if not supported with rich linguistic content ✓ May sometimes be distractive ✓ Creating podcasts require technical knowledge ✓ Some websites require paid subscription ✓ May cause overdependence on technology over time

Methods

This study is aimed at developing authentic podcast activities to improve Turkish language learners' speaking and listening skills. Each activity was designed with goals and themes based on B2 level descriptions of CEFR. Basically, CEFR (2001, p.52) have some themes which are connected with real life. These are "Education, Accommodation, Leisure, Tourism, Travel, Health, The Environment and Describing". In this study, the activities are in the themes of education, travel, health and tourism.

Activity 1, "Island of Tolerance Akdamar Welcomes itsVisitors in all its Splendors ", is designed to develop listening and speaking skills. Learning outcomes (CEFR, 2001). Students can;

- Produce clear, detailed text on a wide range of subjects and explain a view point on a topic issue giving the advantages and disadvantages of various opinions.
- Present clear, detailed descriptions on a wide range of subjects related to their fields of interest.

Activity 1. Island of Tolerance Akdamar Welcomes its Visitors in all its Splendors

“Hoşgörü Adası Akdamar, Tüm İhtişamıyla Ziyaretçilerini Ağırıyor” (Varol & Bilgin, 2019)./Tourism / 2.53. Vocabulary

Island of Tolerance Akdamar Welcomes its Visitors in all its Splendors
“Hoşgörü Adası Akdamar, Tüm İhtişamıyla Ziyaretçilerini Ağırıyor”

Van Gölü'ndeki **Akdamar Adası** ve burada bulunan **Akdamar Kilisesi** (Anıt Müze), her yıl çok sayıda yerli ve yabancı turisti ağırıyor. Bölgede sağlanan huzur ortamıyla son yıllarda turizm alanında hareketli bir dönem yaşayan Van'da Akdamar Adası, kentte inanç turizminin de ön plana çıkmasını sağladı. Gevaş ilçesindeki Akdamar Adası'nda Vaspurakan Kralı 1'inci Gagik tarafından 915-921 yıllarında yaptırılan kilisede gerçekleştirilen ayine Türkiye ve dünyanın birçok yerinden gelen Ermeniler katılıyor. "Hoşgörünün adresi" olarak da tanımlanan ada ve buradaki kilisede, bu yıl da binlerce Ermeni'nin katılımıyla ayin yapılması planlanıyor. Geçen yıl ayine 5 bin kişi katıldı. Kültür ve Turizm İl Müdürü Muzaffer Aktuğ, AA muhabirine yaptığı açıklamada, adadaki kilisenin tarih boyunca iyi korunarak bugünlere taşındığını söyledi. 2006-2007 yıllarında kilisenin restore edildiğini ve çevresinde yürüme yolları, ışıklandırma ve seyir alanı oluşturduğunu anımsatan Aktuğ, şöyle dedi: "2010 yılından bu yana eylül ayında Ermeni ayini yapıyoruz. Ayin için tüm hazırlıkları yapıyoruz. Geçen sene Kültür ve Turizm Bakanımız Mehmet Nuri Ersoy da izledi. Sadece ayine katılan kişi sayısı 4 bin 780 oldu. Misafir olarak gelenleri de hesapladığımızda bu sayı 6 bin kişiyi buluyor." "Akdamar huzur, barış ve hoşgörü adası" Akdamar Adası'nın turizm anlamında kente önemli katkı sağladığını anlatan Muzaffer Aktuğ, "2018 yılında Akdamar Adası'nı 157 bin 560 kişi ziyaret etti. 2019'da şu ana kadar 20 bin 500 kişi adamızı ziyaret etti. Akdamar Adası, huzur, barış ve hoşgörü adasıdır. İnsanların burayı tercih etmelerindeki en büyük etken de bu. Burada medeniyetler, farklı inançlar yaşamış. Burada o inançları, huzuru, önemi yansıtabilmek anlamında Akdamar Adası, gerçekten Türkiye'nin tarihi ve ören yerleri açısından en önemli mekânlarından biri." dedi. Arkeolog rehber Mehmet Kayıcı, önceki yıllarda kilisenin restore edilmesinin çok önemli olduğunu dile getirdi. Kayıcı, "Burada yılda bir kez sembolik olarak ayin düzenliyor. Ermeniler gelip ayinlerini yapıyorlar. Bu da çeşitliliğin birlikteliğidir." diye konuştu (Varol & Bilgin, 2019).

A) Pre-Listening Activities: (Speaking)

1. Read the short summary of the podcast. Predict three things you think the presenters will talk about. Listen and check.

2. Do you like visiting historical places?

3. Have you ever been to any historical place in Turkey? Write their names!

B) While- Listening Activities: (Listening)

1. Play two minutes of the podcast. Stop and predict what you will hear next; continue listening. Were you correct? Repeat this at a few different points in the podcast.

2. Listen and repeat what the speaker is saying. Mumble it under your breath. Repeating this a few times can really help your pronunciation.

3. Write the definitions of the words according to text.

Hoşgörünün adresi/Ada/Kutsal/İnanç Turizmi/Kilise/Ayin

4. Listen and repeat what a speaker is saying. Mumble it under your breath. Repeating this a few times can really help your pronunciation.

C) Post-Listening Activities: (Speaking)

1. What is this podcast about? Who is speaking? What is he talking about? Where is he? What's the general mood of the conversation?

2. Listen to the whole podcast without stopping. Write a short summary of what you heard or record an audio summary of it. Listen again and see if you can add any extra information. Repetition will improve your confidence.

3. What is this podcast about? Who is speaking? What is he talking about? What's the general mood of the text?

Activity 2, "Choose Your Hotel Correctly! It is designed to develop listening and speaking skills. Learners are supposed to use travel vocabulary by getting familiar in both "pre" and "while" activities. Learning outcomes (CEFR, 2001).

Students can;

- understand most TV news and current affairs programs.
- produce clear, detailed text on a wide range of subjects and explain a viewpoint on a topical issue giving the advantages and disadvantages of various options.

Activity 2: Choose Your Hotel Correctly!

"Tatil için Otelinizi Doğru Secin! "/ Travel / 01.31

Listening Comprehension-Vocabulary

ChooseYour Hotel Correctly! "Tatil için Otelinizi Doğru Secin!" :

Yaz geldi! Okullar kapandı ve tatil başladı. Otel arayışına başladınız. Çevremizde daha önce o bölgeye seyahat etmiş kişilere sordunuz ama verilen cevaplar sizi tatmin etmedi. Otel secimi konusunda kararsızsanız bu haber sizin için. İnternette seçiminizi yaparken diğer misafirlerin puanlarına yorumlarına dikkat edin. Eğer daha fazla detay istiyorum diyorsanız, işte sizler için şimdi ufak ipuçları geliyor. Çocuklu bir aile iseniz mutlaka merkeze yakın mesafelerde olan bir otelde konaklamanız en mantıklısı. Deniz tatili yapmaksızın amacınız plaja yakın olmalı tercihiniz otel ki vasıta araç sıkıntısı yaşamayın. Tatile gideceğiniz otelleri sınıflandırırken yıldız sayısına bakmak en bilindik izlenen yöntemlerden bir tanesidir. Tatile gittiğiniz yerde konaklamayı tercih ettiğiniz otelde ne tür bir konfora ihtiyaç duyacağınızı düşünmek ve otel masraflarının neyi karşılayacağını düşünmeniz çok çok önemlidir. Eğer SPA hamam havuz gibi imkânlar varsa bunların ücrete dâhil olup olmadığını mutlaka öğrenmelisiniz. Eğer ücrete dâhil değilse ne kadar fiyatı olduğunu mutlaka önceden sorun. Tabii ki bir otel odasının olmazsa olmazı hijyen. Hangi standartlarda bir otelde kalırsanız kalın temizliğe mutlaka önem vermesine dikkat edin. Wifi imkânı da özellikle son yıllarda otellerde aranan özelliklerden bir tanesidir. Eğer çocuklarınızla birlikte tatile gitmeyi planlıyorsanız, onların rahatlıklarını da düşünmeniz gerekiyor. Mini kulüpler oyun kulüpleri ekstra etkinlikler yapan otelleri tercih ederseniz hem siz rahat edersiniz hem de çocuklarınız. Tüm bu tavsiyelerden sonra gülümseyin ve tatilinizin tadını çıkarın.

A) Pre-Listening Activities: (Speaking)

Talk about the questions below.

1. How do you choose your hotel? Do you use Internet?
2. What are the main standards to consider when choosing a hotel?
3. Are you familiar with these vocabularies? (Her şey Dâhil/Yarım pansiyon/Kahvaltı Dâhil/5 Yıldızlı Otel)
4. Read the short summary of the podcast. Predict three things you think the presenters will talk about. Listen and check.

B) While- Listening Activities: (Listening)

1. Play two minutes of the podcast. Stop and predict what you will hear next; continue listening. Were you correct? Repeat this at a few different points in the podcast.

Answer the questions according to the text.

2. What should be considered while choosing hotel on the Internet?
3. What does the speaker recommend for families with kids?

4. Which ones are mentioned in the text? Circle the ones you heard.

Otelin yıldızına bakmak / Masraflara neler dâhil? / Hijyen standartları/ çocuklar için etkinlikler / Açık büfe içeriği / Havuzunun büyüklüğü / Sahile yakınlığı / Spor sahaları var mı? /Havaalanı, otopar servis hizmetleri var mı?

C) Post-Listening Activities: (Speaking)

1. What is this podcast about? Who is speaking? What is he talking about? What's the general mood of the text? Listen once to answer. Listen again, then compare with a partner.

2. Share one of your hotel experiences with your classmates.

3. Check the hotel ads on Internet and discuss with your peers.

4. Which hotel do you prefer staying? Explain with reasons.

5. Listen to the whole podcast without stopping. Write a short summary of what you heard or record an audio summary of it. Listen again and see if you can add any extra information. Repetition will improve your confidence.

6. Choose a podcast, anything you like to listen to for home work. For the first ten minutes of the following lesson, you will talk about the podcasts you listened to, why you chose it, how easy or difficult it was to understand and whether you learnt anything from it (language or topic-related).

Activity 3, "The Role of University Education on Business Life ", is designed to develop listening and speaking. In the post activity, learners do peer-work to give feedback on each other's writings. Also students will be able to meet with some idiomatic expressions in the text which is a part of culture-language relation. Learning outcomes (CEFR, 2001).

Students can;

- understand most TV news and current affairs programs.
- produce clear, detailed text on a wide range of subjects and explain a viewpoint on a topical issue giving the advantages and disadvantages of various options.

Activity 3: The Role of University Education on Business Life "Üniversite Eğitiminin İş Hayatında Önemi" / Education/03.04

Listening Comprehension-Vocabulary

The Role of University Education on Business Life "Üniversite Eğitiminin İş Hayatında Önemi"

Benim dönemimde seksenlerde üniversiteyi bitirirken özel sektörde ve kamuda şu iki soru sorulurdu: Hangi okulu bitirdin? Hangi Dereceyle bitirdin? Ve İngilizcen var mı? İyi dereceyle bitirmek ve iyi bir okulda okumak, istihdam ve bir de iyi bir insan olmak referansla bir yere gitmek senin o işe alınman için önemli bir nedendi. Çünkü rekabet ulusaldı. Rekabetin ticarete küreselleştiği bir dünyada istihdamda da rekabet küreselleşti. Simdi özel sektör ya da sivil toplum, bizim gibi kuruluşlarda bir insanı işe alırken hangi üniversiteyi bitirdiği hiç birimizin umurunda değil. Hangi dereceyle bitirdiği hiç umurumuzda değil. Biz iki soru sorarız: Niye bize başvuruyu yaptın? Bu konuda bir hayali olup olmadığını ölçeriz, ikincisi de ben sana bu işi verdiğimde bana ne katacağın. Bu soruyu sorduğumuz zaman ODTÜ mezunu da çuvallıyor, Boğaziçilisi de çuvallıyor, Bilkentlisi de çuvallıyor, hepsi için söyleyemiyorum. Hani bunlar en iyi üniversiteler olduğundan söylüyorum. Anadolu'dakiler hepten çuvallıyor. Çünkü hiç böyle bir şey düşünmemiş. Okulda onun aldığı iyi derecede okulu bitirmek. Ailesi böyle şartlandırmış. Hocası böyle şartlandırmış. Ama gerçek hayat öyle gitmiyor. Gerçek hayatta ise artık benim işime ne kadar yarayıp yaramadığı benim için, üniversiteyi bitirip bitiremediği meselesi benim umurumda değil. Burada üniversiteyi bitirmeyen arkadaşlar var. Kırk tane üniversiteliyi cebinden çıkaracak kadar yetenekli ve kapasiteli. Çünkü o burada yaptığı kariyerin daha önemli olduğunun farkına varmış ki orayı geri plan haline getirmiş. Onun için doğru bir kariyer yönlendirmesi, öğrencinin kendini keşfedebileceği alanlara yönlendirilmesi gerekir.

A) Pre-Listening Activities: (Speaking)

1. Read the short summary of the podcast. Predict three things you think the presenters will talk about. Listen and check!

2. Listen and decide. Choose the closest meaning to the words in italics.

a. Rekabetin ticarete küreselleştiği bir dünyada istihdamda da rekabet küreselleşti (Mücadele/ Yarışma)

b. Niye bize başvuru yaptın? (Uygulama/Müracaat)

c. Kırk tane üniversiteyi cebinden çıkaracak kadar yetenekli ve kapasiteli. (Kabiliyetli/Ağırbaşlı)

d. Oxford üniversitesinin öğrencileri geldi bizde staj yaptılar. (Antrenman/İş Deneyimi)

3. What are the effects of universities on business life? Discuss the topics below.

Kariyer imkânı/Burs fırsatları sunması/Tanınır olması/Sosyal-Kültürel Kulüpler/Staj fırsatları

B) While- Listening Activities: (Listening)

1. Play two minutes of the podcast. Stop and predict what you will hear next; continue listening. Were you correct? Repeat this at a few different points in the podcast.

2. Listen and repeat what a speaker is saying. Mumble it under your breath. Repeating this a few times can really help your pronunciation.

While listening, stop and answer the following questions:

3. What are the problems job seekers meet at interviews? What is "çuvallama"?

4. What do the universities need to fulfill their duties?

5. How does the speaker comment about non-university graduates in his work place?

C) Post-Listening Activities: (Speaking)

1. What is your dream job? Can you describe it? Share with your peers.

2. What do you do to land your dream job in the University? Talk about it by using the words below.

Rekabet/istihdam/Kariyer/iyi derece/ işe alma / Aile/Yetenek/Kapasite

3. Choose a podcast; anything you like to listen to for homework. For the first ten minutes of the following lesson, you will talk about the podcasts you listened to, why you chose it, how easy or difficult it was to understand and whether you learnt anything from it (language or topic-related).

4. What are the questions asked in interviews at 80's and now? Fill in the chart according to text.

80'ler	Şimdi
1.	1.
2.	2.
3.	3.

Activity 4, "Tips for Healthy Life" is designed to develop listening and speaking skills. Vocabulary about health is an asset as well. Learners will be able to comprehend the text by extensive listening which is described as "listening for details" (Alshaikhi & Madini, 2016). Learning outcomes (CEFR, 2001).

Students can;

- understand the main idea of complex text on both concrete and abstract
- passing on information or giving reasons in support of or against a particular point of view.

Activity 4. Tips for Healthy Life "Sağlıklı Yaşama Geçmenin ipuçları" / Health / 4.56 Listening Comprehension-Vocabulary

Tips for Healthy Life ,"Sağlıklı Yaşama Geçmenin ipuçları":

Hayatında yapacağın küçük değişikliklerle çok daha sağlıklı olman ve yaşam kaliteni yükseltmen mümkündür. Sağlıklı ve uzun bir yaşam herkesin hayalidir. Tabii, her yer çikolata, pasta ve daha birçok sağlığa zararlı olan yiyecek kaynıyor. Günümüzde birçok kişi ofislerde saatler boyunca neredeyse kıpırdamadan çalışmak zorunda kalırken sağlıklı bir yaşam stilini benimsemek de oldukça zor oluyor, biliyoruz! Yine de, hayatında yapacağın küçük değişikliklerle çok daha sağlıklı olman ve yaşam kaliteni yükseltmen mümkün.

İşte sana bizden birkaç ipucu: **Uyku çok önemli!** Mutlaka ama mutlaka uyu! Karanlık ve sessiz bir ortamda çekeceğin 8 saatlik bir uyku hem yaşam kaliteni yükseltecek hem de gün boyu çok daha enerjik olmanı sağlayacak. **Sağlıklı ve düzenli beslen.** Sağlıklı bir yaşamın en önemli parçası ise sağlıklı beslenme. Biliyoruz, yeme alışkanlığını değiştirmek birçok kişi için çok zor, ancak hayatından zararlı besinleri ufak ufak çıkartarak yavaştan sağlıklı beslenme ritmini tutturabilirsin. İşe şekerli yiyecek ve içeceklerden mümkün olduğunca uzak durarak başlayabilirsin mesela! **Sporu sakın aksatma.** Eğer ofis çalışıyorsan ve gün içerisinde pek hareket etme imkânı bulamıyorsan, işe gidiş-gelişlerinde belirli bir mesafeyi yürümeyi düşünebilirsin. Unutma! Sağlıklı bir yaşam için günde en az 10.000 adım atman gerekiyor! **Alkol ve sigaradan uzak dur.** Alkol ve sigaranın zararları saymakla bitmez. Sağlıklı bir vücut ve zihin için bu ikisinden de uzak durmalısın.

Stres kapı dışarı! Şehir yaşamında stresten uzak durmak neredeyse imkânsızdır. Sinirleri pamuk gibi olan biri bile gün içerisinde karşılaştığı çatışmalar, kavgalar ve sorunlar nedeniyle işlerini bitirip evine döndüğünde kendini tükenmiş olarak buluyor. En iyi çözüm ise "umursamamak". **Güneşten korun.** Güneş ışınları çok, çok zararlı ve cildin vaktinden hızlı yaşlanmasından cilt kanserine kadar birçok sorun ve hastalığa sebebiyet veriyor. Bu sebepten kış aylarında bile güneş kremini yanından ayırmamanı ve güneş ışınlarının en güçlü olduğu saatlerde (11:00-18:00) dışarı çıkmamanı öneriyoruz. **Az ve öz ye.** Porsiyonlarını yemeğe oturmadan önce ayarla ve her öğününde aynı oranlarda yemeye

önem göster. Mideni ne kadar doldurursan, vücudun da o denli çalışmak ve yorulmak zorunda kalır. Bu sebepten dolayı sağlıklı beslenmenin yanında belirli ölçülerde yemende fayda var. (<https://www.nnhayatemeklilik.com.tr/blog/iyi-vasa/saglikli-yasam-icin-7-ipucu> 24.04.2020).

A) Pre-Listening Activities: (Vocabulary)

1. Read the short summary of the podcast. Predict three things you think the presenters will talk about. Listen and check.

2. What is being healthy like? Please, describe.

3. Do you follow any method to be healthy? Discuss with your friends.

B) While- Listening Activities: (Listening)

1. Play two minutes of the podcast. Stop and predict what you will hear next; continue listening. Were you correct? Repeat this at a few different points in the podcast.

2. Listen to the podcast and tick the ones out of the speaker's targets.

Hedef Belirleyin	çok çalışın
Kaslı Olun	Spor yapın
Su tüketin	Düzenli uyuyun
Seyahat edin	İstikrarlı olun
Sebze meyve tüketin	Kendinize vakit ayırın
Sağlıksız yiyecekleri sınırlayın	Bol kitap okuyun

3. Listen to the podcast again and choose the correct option.

a. Vücudumun.....değerlerini düzeltmek diyebiliriz aslında buna. (kan /kilo)

b. Hani biz zaten Türk insanıyız, sofralarımızdan..... eksik olmaz. (Zeytinyağları/Hamur işleri)

c) çünkü ben bunları.....seviyorum. (pişirmeyi/yemeyi)

d) Dolayısıyla diğer günler sağlıklı beslenince bunları canımızda çok..... (çekmiyor/istemiyor)

e)geçirdiğimiz iyi zamanlar bize iyi geliyor. (başkalarıyla birlikte/kendi kendimize)

f) Benim için aslında bu videoyu.....düşündüğüm en önemli şey buydu. (çekerken/kaydederken)

3. Fill in the chart with the words in the box.

8 saat uyku / yürüyüşler/ şişeler/kilo vermek / sebze-meyve

Hedef belirleyin	Sağlıklı beslenin	Düzenli uyuyun	Kendinize vakit ayırın	Daha çok su tüketin

4. Listen and repeat what a speaker is saying. Mumble it under your breath. Repeating this a few times can really help your pronunciation.

C) Post-Listening Activities: (Speaking)

1. What do you think about the tips in the texts? Do you think they are useful?

2. Make a survey using the targets in the text and ask at least 5 people in the class.

3. Report the results of your survey on the board.

4. Listen, then summarize the text. After listening a second time, add more information to your summary and compare it with a partner.

5. What is this podcast about? Who is speaking? What is he talking about? Where is he? What's the general mood of the text? Listen once to answer. Listen again, then compare with a partner.

Conclusion

New generations are closer to digital life than previous ones. They will benefit from podcasts and internet materials without having difficulties. In daily life, they can access these materials with no limitation in time and place. Even, language teachers can introduce a new content unit to students; a podcast might be the way to bring up the subject. With these twelve activities on B2 level with CEFR, outcomes are expected to develop the following skills:

1. Using podcasts in teaching Turkish as a foreign language is not very common. Thus Podcasts can be used as supporting materials along with the course materials to develop students' proficiency in Turkish.

2. These podcasts are resources for listening comprehension materials in Turkish language class. Most of them are relatively short, so you can easily give a listen on your own before your students arrive, and come up with a few comprehension questions for your students to answer after they listen.

3. These podcasts can be very helpful for Turkish language learners to record themselves speaking and then listen to that record and evaluate their own speech.

4. These podcasts can be used as homework to listen to; and students can produce their own podcasts.

5. In some activities, learners find visual components. The visually supported exercises attract students with different learning styles. Also, visual materials have a motivating effect as concrete.

6. Teachers and students can produce their own podcasts by using the guideline in the study.

7. Students are exposed to idiomatic expressions and cultural aspect of Turkish. Cultural transmission enhances full-understanding of meaning and functions of a language.

8. Listening texts used in activities are authentic materials, which are downloaded from the Internet. Internet is a visible part of our daily life and authenticity of these texts will motivate students to learn.

9. The activities might be used both in and out of the class. Learners can practice them as they are independent from a text book and the outcomes are related to real-life.

10. Podcasts can also be used as a tool for developing students' pronunciation.

As a final step, it should be emphasized that all activities are efficient when used in real contexts by learners. For this reason, this study might be developed by observing learners who practice the activities. Further studies might be done to measure learners' attitudes over them.

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ACTIVITIES FOR TEACHING ILLUSTRATED CHILDREN'S BOOKS THROUGH CREATIVE DRAMA METHOD: THE FRIENDS OF THE PAINTERS

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Introduction

Books, which affect individuals' perspectives on events, enable them to express themselves better and play an important role in the development of thought, provide a lot of information about life, the world, science and art and contribute to the development of imagination at the same time. Children who meet with books at a young age can benefit from these advantages and can make more progress in terms of both language development and cognitive development. It was revealed by Şirin (2000) that children's books prepared in line with the suitability principle for children affect the moral development, social development and personality development in addition to these areas of development. It was stated by Mendoza and Reese (2001) that works of children's literature can serve development in aesthetic, psychosocial and educational aspects. In order to support the development of all these areas, it is very important to choose quality books that are suitable for children's levels. One of the important elements to be considered in the selection of books for preschool and primary school children is that the books are supported with meaningful and quality images appropriate for the content.

Children combine their prior knowledge with the information contained in the pictures and texts of the book and use appropriate processes to recognize basic concepts, synthesize and summarize information, make inferences, and predict the next stage of the story (Paris & Paris, 2003; as cited in Mantzicopoulos & Patrick, 2011). In addition to reading, another method that can be used in terms of achieving these is creative drama.

Creative drama, which is a field of art in itself, is also an alternative teaching method. With the techniques used as a teaching method and applications with rich content, it provides permanent learning while creating a learning environment for the participants by experiencing and having fun. It offers a variety of ambiance for the participant to express

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himself/herself. With its aspect of being an art field, it has a very close relationship with the branches of art within the scope of the process. Almost every field of art, especially painting, music and poetry, enriches the process and offers a rich environment where participants can express their creativity.

Some of the definitions of the creative drama in the literature are as follows: San (1990) describes the concept of creative drama as "individuals' interpretation and impersonation of an experience, an event and sometimes an abstract concept or a behavior in a group work through game-like processes by using improvisation, role playing, theater or drama techniques." The concept is expressed by Adıgüzel (2013) as "impersonating a goal or a thought by using techniques such as improvisation, role playing based on the life experiences of the members of a group."

There are many benefits of using creative drama as a method in education for the participant. According to Bell (2008), participants learn to express their own feelings through communication in the play and role playing processes. It has been stated by McNaughton (2004) that including drama in education can help the individual to develop his/her communication and decision-making skills and gain sensitivity towards friends. Sağlam (2004) also emphasizes that drama significantly contributes to the development of skills such as realization of one's own potential, self-expression, creativity, and empathy and can make individuals happy. It is stated by Üstündağ (1994) that the drama offers the opportunity to work together and share responsibilities for the individual to realize himself.

Creative drama processes include exercises such as movement and rhythm, pantomime, improvisation, character studies, and speech (McCaslin, 1990). There are three consecutive stages in a lesson plan structured with the creative drama method. These stages are preparation/warm-up, impersonation and evaluation/discussion. "Preparation/warm-up studies constitute the stage in which the body is put into action, the senses are used simultaneously and intensively, internally oriented work is carried out, which is performed in order to establish group dynamics such as gaining trust and adaptation, whose rules are identified and determined more by the leader in comparison to the other stages" (Adıgüzel, 2006). Free walks, games and some exercises are often used at this stage. The main purpose of this stage is to prepare the participant dynamically and mentally for the impersonation stage. The impersonation stage is the stage where many techniques are used, mainly theater techniques such as role playing, improvisation, role changing. The evaluation/discussion stage is the stage where opinions are shared on how the participants have felt in the process, what they have learned and what

they have become aware of. Whether the gains have been achieved is evaluated at this stage.

Creative drama, which has an important role in terms of achieving educational goals, supports the learning process in many areas. This method, which overlaps with the philosophy of student-centered education approach, provides rich experiences to students in terms of enabling them to impersonate the events and situations in the texts, which shows that this method can be employed when teaching children's books. Therefore, within the scope of the study, it was aimed to prepare lesson plans that were structured with the creative drama method based on the children's books included in the "The Friends of the Painters" series.

Method

Within the scope of this study teaching of the books included in the series "The Friends of the Painters" were thoroughly examined and activities based on creative drama method were developed. The books titled Gauguin / My Friend Paul, Degas / My Friend Edgar, Monet / My Friend Claude and Van Gogh / My Friend Vincent were included in the study.

The plans, which were structured in accordance with the fourth grade level of primary school, were prepared to cover two lesson hours, and a total of eight hours of implementation was planned for four books. The gains that were desired to be achieved for each session were determined, and the methods and techniques and tools and equipment that would enable to achieve these gains were listed. Within the scope of the process, two activities were developed for three stages of creative drama for each book, and these activities were explained in detail. Information regarding the books covered in the study is given in Table 1:

Table 1. Information about the books

The Title of the Book	Original Title of the Book	Year of Publication	Date of Translation	Translator
Gauguin / My Friend Paul	Els Amics Dels Pintors-Gauguin	2013	2018	Berna Yılmazcan
Degas / My friend Edgar	Els Amics Dels Pintors-Degas	2013	2018	Berna Yılmazcan
Van Gogh / My friend Vincent	Els Amics Dels Pintors-Van Gogh	2013	2019	Berna Yılmazcan

Monet / My Friend Claude	Els Amics Dels Pintors-Monet	2013	2020	Berna Yılmazcan
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“The Friends of the Painters” series consists of four books written by Anna Obiols and illustrated by Subi-Joan Subirana. The Turkish translations of the books, whose original language is Spanish, were made by Berna Yılmazcan and published by Binbir Çiçek Books. Information about the life of four painters, including Vincent Van Gogh, Edgar Degas, Paul Gauguin and Claude Monet, and the art they perform are told through stories created from the works of the painters. There are four books in the series that describe the painters separately. Each book includes a child protagonist whom the painter is friends with. The pages of the book are prepared based on the works of the painters, and the story characters are positioned on these works. In the biography section at the end of the books, the life of the artist is explained, and brief information about him is presented. In the “Artist's Style” section, the art movement by which the artist was influenced was mentioned and how the artist applied this trend was explained. Each of the books suitable for four years and above consists of thirty-five pages. Below is general information about the books in the series:

Gauguin, My Friend Paul: A painter named Paul Gauguin moves to the island where a child from Tahiti named Jotepha lives. Jotepha soon becomes friends and spends time with him. In the book, while Jotepha explains what he does with Gauguin, information about Gauguin's paintings and life is also provided.

Van Gogh, My Friend Vincent: Paula, who lives in Arles, becomes friends with Van Gogh, who has just moved there. With him, she goes for a walk in the countryside and spends time in the garden. In the book, Paula describes what she does with Van Gogh and gives information about his paintings.

Degas, My Friend Edgar: Ballerina Marie is a girl who has been doing ballet since she was a little girl. She becomes friends with a painter named Edgar Degas, who draws their paintings at the ballet school. Marie describes Degas and his works in this book.

Monet, My Friend Claude: A boy named Philippe goes to visit his aunt, where he meets a painter named Claude Monet. In this book, Philippe describes what he does with his new friend and the paintings he drew.

Lesson Plans Structured With Creative Drama Method

Session 1 Name: An Artist at the Ballet School: Degas

Gains:

- The student makes the movements he sees by using his/her body.
- Makes predictions based on visual and written materials.
- Builds empathy.
- Offers solutions suggestions to problems.
- Recognizes the major works of Edgar Degas.

Methods and Techniques: Drama/conscience alley, group impersonation, six thinking hats, collective/group picture

Tools and Equipment: Anna Obiols & Subi's "Degas, My Friend Edgar" book, drawing paper, crayons, printings of Degas' paintings, background cardboard in six colors (white, red, black, yellow, green, blue)

Process

A. Warm-up/Preparation

Activity 1: Students are dispersed in the classroom. The teacher asks which dance types they know, and after getting their answers, she/he asks each student to choose a dance type and perform that dance. While the students are dancing, the teacher says, "Stay as you are", and the students wait in the position they are in at that moment. The teacher touches the children and asks them to tell what dance they have been doing and then she/he asks them to continue their dance. (As each student will perform a different type of dance, a certain piece of music is not used in order not to limit their dance types.)

Activity 2: Students form a circle. The teacher asks the students to think about the dances they have performed in the previous activity. A student comes to the center of the circle and tries the dance type that one of his friends performed during the previous activity. The one who first guesses the student who performed the dance comes to the center of the circle and performs the dance type of another student. Standing students also try to do the new dance. The process continues in this way (Dancers cannot say that the dance type belongs to themselves).

B. Impersonation:

Activity 3 (Conscience Alley): The students sit in a circle. The teacher asks, "Have you heard of a painter named Edgar Degas?" If the students respond that they have heard, then the teacher asks what they know about him. Then she/he shows the book titled 'Degas, My Friend Edgar', asking students to make predictions about the content of the book and the artist based on the cover of the book. After the responses she/he receives, she/he tells that the paintings in the book are copies of the artist's paintings and asks them to examine the paintings while she is reading the book aloud.

She/he then shows the original paintings of the artist and compares them with those in the book.

The teacher asks the students, “Ballerina Marie said that Degas was constantly watching them and drawing their pictures. Although they were uncomfortable in the beginning, they became friends later, and this situation did not bother them much anymore. What would you feel if you were in Marie's shoes?” and receives answers from the students.

Then she/he says, “If ballerinas were not friends with Degas and were uncomfortable with him, what should Degas have done? Should he have stopped drawing because the ballerinas were uncomfortable? Painting was everything to him, his profession. What would he do if he quit painting?” and asks students to think about these questions. The class is divided into 2 groups by giving students odd and even numbers. The first group is lined up on one side of the class, side by side. The other group stands side by side, facing the 1st group. A distance between the two groups is left in such a way that a person can easily walk. A student from the class assumes the role of a painter. The first group makes suggestions for the painter to give up painting, and the second group recommends him to continue drawing paintings. The painter slowly moves through the alley between the two groups. Individuals in the groups speak out their suggestions. When the painter returns to the starting point again, she/he makes a decision and explains his/her decision to his friends.

Activity 4 (Group Impersonation): The class is divided into 4 groups by numbering the students with 1-2-3-4. The teacher tells the groups that Degas will continue to paint, but he does not want to disturb the ballerinas, and he is wondering how he can draw their paintings without them noticing and asks the groups to impersonate how Degas will observe the ballerinas and not show that he is drawing their pictures. Groups are given time to prepare, then the groups perform their impersonation.

C. Evaluation/Discussion:

Activity 5 (Six Thinking Hats): The teacher reads aloud Edgar Degas's biography and 'Artist's Style' sections at the end of the book. She/he asks students to analyze the printings of Degas' paintings and interpret his style. She/he asks them about what is in Degas's drawing style. She/he writes what the students remember and the information in the book on the board.

- Degas is known for his ballerina and race horses paintings.
- He was also an engraver, sculptor and photographer.
- Like his colleagues, he was not interested in capturing nature and light, he would rather depict artificially illuminated interiors.
- His similar aspect to his colleagues was to reflect concrete memories and to study the movement with utmost care.

- After softening the pastel paint with steam, he applied it to the canvas with brushes and his fingers.

Information similar to the above statements are written on the board in a way that students can see. Students are divided into 6 groups by means of counting. Each group represents one group of six thinking hats technique. The teacher gives the groups a background cardboard of different colors to represent the hats. According to the nature of the cardboard color, the students evaluate Degas's painting style and write a slogan on the cardboard (White: neutral, red: emotional, black: pessimistic, yellow: optimistic, green: creative, blue: evaluative).

Activity 6 (Collective/Group Picture): The teacher distributes drawing papers and crayons to 6 groups and asks them to portray the classroom environment they depict in a similar way to Degas's paintings. When the groups complete their drawings, the pictures are displayed in the classroom.

Session 2 Name: Gauguin's Journey

Gains:

- The student dramatizes a short story.
- Improvises.
- Suggests different solutions to the problem.
- Paints in a similar way to the artist's style.
- Keeps a diary by putting himself/herself in someone else's shoes.
- Recognizes the major works of Paul Gauguin.

Methods and Techniques: Drama / narration, improvisation, role-play alley, collective / group picture, writing in role

Tools and Equipment: Anna Obiols & Subi's "Gauguin, My Friend Paul" book, drawing paper, crayons, printings of Gauguin's paintings

Process

A. Warm-up/Preparation

Activity 1 (Narration): The teacher tells the students a story, and while the students are listening to the story, they try to impersonate what the character is doing. The teacher also impersonates with the students.

Story Told: One day, the painter named Paul Gauguin decided to move. He collected his belongings and prepared his luggage. He put the paints necessary for painting in his backpack, put the backpack on his shoulder, and set out taking his canvases with him.. He walked, walked, and walked. He was having difficulty carrying his belongings because they were heavy. In the distance, he saw the train station, and he stayed put. What was that? The train he was going to take was about to leave, so he started running

quickly. He ran, ran, and ran. He caught the train and threw himself in just as the doors were closing. He immediately got into a wagon and took a deep breath as he was able to catch the train. Throughout his journey, he watched out of the window and dreamed of his destination.

Activity 2:

The teacher continues the story: "*Gauguin finished his journey and arrived in Tahiti Island, where he was moving. Gauguin, who did not know anyone, went around house by house and searched for a place to stay.*" The teacher assigns the students numbers as 1-2-3. Students 1 and 2 hold hands face to face in the classroom. These people are the hosts. Students with number 3 become Paul Gauguin. The teacher calls out "Gauguin", students who are Gauguin get into the arms of their hosts. One student can enter each home. When the teacher calls out "Gauguin" again, the guests change places, but they cannot go to the houses adjacent to the house they are in. When the teacher calls out "the host," the hosts change places, students in the role of Gauguin remain steady. When the teacher calls out "Tahiti", the whole class changes places and creates new houses. The student left out in the games tries to find a new place during the relocation.

B. Impersonation:

Activity 3 (Improvisation): Students form a circle. The teacher asks, "Are you wondering what Gauguin is doing on the island of Tahiti?" and says, "So let's read the book and see what he has done." She/he reads aloud the book "Gauguin, My Friend Paul". When the book is finished, she/he takes the opinions of the students about Gauguin, shows the original paintings of Gauguin to the children, and gives them the opportunity to examine them. She/he then creates 4 groups by means of counting numbers. She/he asks the groups to discuss what the people there thought about Gauguin when he arrived in Tahiti, where he was a stranger. She/he explains, "Gauguin does not speak the same language as they do, has a different appearance, and is constantly painting the environment; the local people discuss among themselves how to behave towards him." Each group represents a group of indigenous people, improvising according to the characteristics of their groups.

Group 1: They improvise about who Gauguin is.

Group 2: They improvise about how to meet Gauguin.

Group 3: Because they don't speak the same language as Gauguin, they improvise about ways to communicate without speaking.

Group 4: They examine the paintings drawn by Gauguin, and improvise about what he pays attention to when painting.

At the end of the impersonations, "Thus, the people of the island complete their process of meeting with Gauguin and become friends with him," says the teacher.

Activity 4 (Role-play Alley): The teacher tells the children that Gauguin loves drawing what he sees, he drew the island inhabitants a lot, and opening the twenty-fifth page of the book, she/he explains the situation. "*While Jotepha's brother and friend Vaitua were sitting on the beach, Gauguin wanted to paint them. Jotepha's brother was very happy to have his painting made, but her friend did not like the idea very much. How can Jotepha's brother convince him?*" the teacher asks. The class is divided into two groups, one group must have one more member than the other. Groups are lined up in a row in parallel. One group takes the role of the brother who wants his painting to be made, and the other group takes the role of the friend who does not want his painting to be made. The students in the front row begin to discuss the issue, and those in the role of the brother try to convince the ones impersonating the friend. When the teacher says change, the ones in the front row move to the last row, and now the new people in the front row continue from the sentence the others left. According to the course of the process, the activity is concluded either in convincing the friend or not.

C. Evaluation/Discussion

Activity 5 (Collective/Group Picture): Students are divided into four groups. The teacher reads out the sections of 'Biography' and 'Artist's Style' at the end of the book and gives each group drawing papers, crayons and printouts of Paul Gauguin's paintings (For awareness purposes, the names of the paintings should be written on the edges of the paintings). She/he asks the students to study the paintings and draw a picture of a beach similar to Gauguin's paintings. The pictures completed are exhibited in the classroom.

Activity 6 (Writing in Role): The teacher reminds the students of the performances in which they impersonated how the people of the island met Gauguin. Then she/he asks them to guess what Gauguin might have thought about the island people and to write notes in the diary named 'Noa Noa' placed at the end of the book as if they were Gauguin.

Session 3 Name: In Pursuit of the Small Boat

Gains:

- The student uses his/her body in accordance with the directive.
- Makes predictions based on written and visual material.
- Uses his/her body in a way to evoke entities and protagonists.
- Expresses his/her feelings and thoughts through written, oral and visual materials.

- Realizes the similarities between works of art.
- Recognizes the major works of Claude Monet.
- Paints in a similar way to the artist's style.

Methods and Techniques: Drama / thought tracking, station, frozen image, collective/group picture

Tools and Equipment: Anna Obiols & Subi's "Monet, My Friend Claude" book, drawing paper, crayons, printouts of Monet's paintings, small flowers made of cardboard of different colors

Process

A. Warm-up/Preparation

Activity 1: The students sit on the floor in a circle, the teacher tells the students to close their eyes and imagine themselves in a garden full of flowers. Meanwhile, the teacher scatters small flowers made of cardboard of different colors on the floor of the classroom and turns on the music (Dmitri Shostakovich-Waltz No.2). She/he tells the students, "You are in a garden full of flowers, and you hear a very nice piece of music. Now open your eyes and dance in the garden." Students dance freely on the flowers. The teacher stops the music and gives instructions such as "Collect red flowers, collect blue flowers". The students collect the flowers and the music is turned on again. The process is repeated several times.

Activity 2: The teacher shows the students Monet's painting titled "Poppy Field" and tells that the red flowers they have just collected come from this garden. He asks each student to get a flower seed. The students bend on the floor in a dispersed way and become seeds. They act according to the teacher's instructions.

Instruction: It is raining, you are getting wet, the sun is shining, you are slowly growing, the wind is blowing and you swing, you are about to break off the ground, the sun is shining again, you grow a little more and you open your leaves, the season is changing, you are slowly beginning to fade.

B. Impersonation:

Activity 3 (Thought Tracking): The teacher shows the book 'Monet, My Friend Claude', and, based on the cover of the book, asks for predictions about the content of the book and the artist. After the responses she/he receives, she/he tells that the paintings in the book are copies of the artist's paintings and asks them to examine the paintings while she is reading the book aloud. After reading the twenty-eighth and twenty-ninth pages, she/he stops and asks the children to think about where the boat might have gone. *"That night, I fell asleep believing that I could never find my boat anymore. 'I have to build another boat,' I said sadly. In the morning, the first lights of the sun was illuminating a boat that was floating*

in the water. ” Then, she/he asks the students to give the form of the boat in the water to their bodies. Touching the children randomly, she/he asks, “Where would you go if you were that little boat? What would you do on the river?” At the end of the process, the teacher reads out the last page of the book.

Activity 4 (Station): The teacher tells the students that Monet turned a boat into a workshop, sailed away to the river and drew open-air paintings, and that one day Monet noticed that the boat was taking in water from some part when he was sailing away on the boat. The students are divided into 3 groups by means of counting numbers and the groups move to the pre-assigned areas for them. "The inside of the boat is full of paintings he made, Monet is wondering what to do desperately," says the teacher, and the students find solutions to what Monet could do in that situation.

Group 1: They draw a picture.

Group 2: They write a story.

Group 3: They prepare impersonation.

Groups change places in ten-minute periods. Finally, the prepared solutions are shared with the class.

C. Evaluation/Discussion:

Activity 5 (Frozen Image): Students are divided into four groups. They randomly choose one of Monet's paintings, and the teacher asks the students to impersonate the painting in the form of a frozen image by using their body in groups.

Activity 6 (Collective / Group Picture): The teacher reads out Monet's biography and “Artist's Style” sections at the end of the book. She/he assigns each group one of the places mentioned in the biography (the boat he turned into a studio in Paris, the big pink house in the town of Giverny, the orchard, the pond with the Japanese Bridge). Students examine Monet's paintings and guess which of these paintings were made where their groups are located and they draw a picture similar to that picture.

Session 4 Name: Living Paintings

Gains:

- The student acts in accordance with the instructions.
- Improvises.
- Expresses his/her feelings and thoughts in accordance with his/her role.
- Makes comparisons while listening.
- Writes a letter.
- Makes inferences about written and visual materials.

- Recognizes the major works of Van Gogh.

Methods and Techniques: Drama / imaginary painting, simultaneous improvisation, gossip ring, collective/group painting, writing in the role

Tools and Equipment: Anna Obiols & Subi's "Van Gogh, My Friend Vincent" book, drawing paper, crayons, gouache, printouts of Van Gogh's paintings, video titled 'Van Gogh's paintings: Masterpieces come to life', envelopes in the size in which the book could fit, Theo's Letter

Process

A. Warm-up/Preparation

Activity 1: The teacher asks the students, "Think about the paintings of the painters, how would it be like if the drawings in the paintings moved?" After the answers, she/he plays the video titled 'Van Gogh Living Pictures' (YouTube: The video titled 'Van Gogh's paintings: Masterpieces come to life' on Matt Bookman's channel). The teacher says that the class is a painting and asks the students to act like they were a drawing in this painting. Students can become an element such as a tree, a cloud, people, cars etc. as they wish. Students stand still and form the painting. The teacher says that the artist who drew them was Van Gogh, and they come to life when she/he says "Van Gogh", and they remain still when she/he says "Painting". During the process, the music piece titled 'Ludovico Einaudi- Experience' included in the video is played.

Activity 2 (Imaginary Picture): Students stand dispersed around in the classroom. The teacher tells the students that they are the painter now and asks the students to imagine that there is an imaginary canvas in front of them and to paint with imaginary paints. Students paint by imagining as if they were painting on a real canvas. During the process, music piece called 'Francine Leblanc- Rue de Rivoli' is played.

B. Impersonation:

Activity 3 (Simultaneous Improvisation): The students sit in a circle. The teacher shows a large envelope to the students and asks them to guess what is inside. After the guesswork, she/he opens the envelope and takes out the letter and the book 'Van Gogh, My Friend Vincent'. She/he reads out the letter: *"Dear students, I am sending this letter to you from far away. My name is Theo, I'm the brother of the painter Vincent Van Gogh. My brother is a very successful painter and loves children very much. So, I am sending you a book that gives information about him. If you read the book and examine my brother's paintings, you will make me very happy. So tell me, who wants to read the book first?"* One of the students reads the book by showing it to the class. After the book is finished, the teacher shows the original drawings that came out of the envelope next to the pages of the

book. She/he lets them examine the paintings. The teacher asks the students to form groups of 2 and reads out the following part from the biography on the last page:

“Thanks to the letters they wrote to each other with his brother Theo, we have information about his work and his life. Theo was the only person who had been with him throughout his life. He provided Vincent with financial support and introduced him to painters because he was an art dealer.” She/he then asks one of the group members to be Van Gogh and the other to be Theo and chat about the paintings. While all groups are chatting, the teacher selects a group randomly, other groups watch the improvisation of that group, the process continues with different groups.

Activity 4 (Gossip Ring): The class is divided into 4 groups by numbering as 1-2-3-4. The teacher reads out his biography. She/he emphasizes that Van Gogh could not get along with the painter named Gauguin, whom he lived together. She/he says that all four groups represent a group from the circle of these two friends:

Group 1: Art Merchants (People buying paintings)

Group 2: Neighbors

Group 3: Painter Friends

Group 4: The Staff of the Restaurant They Regularly Went To

The teacher starts the story: *“One day Van Gogh and Paul Gauguin have a big fight, they are so angry that Gauguin leaves Arles. The townspeople wonder about the cause of the fight, and rumors grow when the rumor that Van Gogh cut his ear spreads.”* Groups gossip in order according to their roles, one group can be influenced by the gossip of the other group and make additions. The townspeople try to clarify this fight. They cannot solve the cause of the incident, but at the end of the process, the teacher shows Van Gogh's self-portrait with his ear cut, shedding light on the rumors about his ear being cut.

C. Evaluation/Discussion:

Activity 5 (Collective / Group Picture): The teacher reads out the “Artist's Style” section at the end of the book and gives each group drawing papers, crayons, gouache and printouts of Van Gogh's paintings (For raising awareness, the names of the paintings should be written on the edges of the pictures). The teacher asks the students to examine the paintings and discuss how Van Gogh made the pictures that seemed so alive (how can Van Gogh's paintings look as if they were moving? What colors did Van Gogh use in his paintings? How does Van Gogh use brush strokes?), then she/he asks them to make a picture that looks as if they were alive, like Van Gogh's paintings.

Activity 6 (Writing in the Role): The teacher asks the students what they think of Van Gogh. She/he explains that Van Gogh's paintings were found strange and different in the period he lived due to his painting style, and that this situation also affected Van Gogh psychologically. She/he then asks the students to write a letter from Van Gogh to his brother Theo, considering these facts.

Conclusion, Discussion and Recommendations

Within the scope of the study, in which sample lesson plans for the teaching of four books in the “The Friends of the Painters” series with the creative drama method were prepared in detail, sessions plans were created for each book, and activities for the warm-up/preparation, impersonation and evaluation/discussion stages were developed in line with the determined gains. When the literature was examined, it was determined that there are many studies carried out regarding the creative drama method, and it was found that the studies were generally carried out in order to investigate the effect of this method at different grade levels and lessons, and that there was no study directly related to the subject covered in this study. In the study carried out by Susar-Kırmızı (2008) in order to determine the effect of creative drama method on the attitudes of primary school fourth grade students towards reading and their reading comprehension strategies, it was concluded that the method was effective in developing reading comprehension strategies while no significant difference was found between the attitude post-test scores of the experimental and control groups. The findings obtained in the study conducted by Kahyaoğlu, Yavuzer and Aydede (2010) to investigate the effect of creative drama method on the fifth grade science course showed that this method had a positive effect on students' success in the course. In the study carried out by Aykaç and Adıgüzel (2011), the effect of teaching the fourth grade social studies course with creative drama method was investigated and after the implementation process, it was found that there was a significant difference between the post-test scores of the experimental and control groups in favor of the experimental group with whom creative drama method was used. In the study conducted by Aktepe and Bulut (2014) in order to determine the effect of the method on mathematics achievement of third grade students in primary school, it was revealed that the method had a positive effect on mathematics achievement, and that there was a significant difference between the achievement post-test scores in favor of the experimental group. As a result of the study conducted by Eti and Aktaş-Arnas (2016) that investigated the effect of story-based creative drama activities on expressive language development of four-year-old children, the method was found to be effective on the variables handled. When the results of the studies were examined, it was seen that creative drama method generally had a positive

effect on the variables whose effects were investigated. The results obtained brought along suggestions that the method should be used in the lessons. While taking into consideration these suggestions, which emphasize the importance of the method, it should not be overlooked that the method should be applied effectively. For this reason, studies in which information and application examples on how to plan courses taught with creative drama method are included are important. Studies conducted for this purpose in the literature are rather limited compared to the studies investigating the effect of the method. Within the scope of the study conducted by Duatepe and Akkuş (2006), creative drama-based lesson plans were prepared for the sixth grade mathematics lesson sub-learning area of sets. In the study carried out by Şahin and Yağbasan (2012), examples of lesson plans related to the physics course structured with creative drama method were included. Within the scope of the study carried out by Küçükkaragöz and Av-Hartuç (2015), lesson plans were prepared for the teaching of primary school second grade life science subjects with the drama method. Increase in the number of these studies, which are important in terms of shedding light on the field, will enable the method to be applied more effectively. Therefore, the following suggestions have been developed within the scope of the study carried out:

- Special emphasis should be given to preparing plans for the application of creative drama method.
- In particular, studies including examples of how to use this method in the teaching of children's books should be made widespread.
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THE EFFECT OF USING MULTIMEDIA-SUPPORTED PREDICT-OBSERVE-EXPLAIN TECHNIQUE IN 2ND GRADE LIFE SCIENCE ON STUDENTS' ACHIEVEMENT AND THEIR ABILITY TO RELATE TO DAILY LIFE

Sevda Çetinkaya & Filiz Hatay Uçar***

INTRODUCTION

Life Science course is one of the core courses children have from the first year they start elementary school to third grade. Different from the other core courses in the first, second and third grades, Life Science is a course that enables students to develop as a whole, constitutes important elements of education and helps students attain moral values (Gülaydın, 2002). According to Şimşek (2005), Life Science is a course that equips children with knowledge and skills, helps them become individuals compatible to social life, enables them to bring solutions to problems they face in daily life and helps them socialize. Life Science was designed for children to learn and understand the society and world they live in. Life Science has been included in the 1924, 1936, 1948, 1968 and 2005 primary programs, and is part of the 2009 program with the same name (MNE, 2009). When the history of Life Science is examined, it is seen that Life Science program has been revised constantly to eliminate the shortcomings (Tay & Baş, 2015). In the 2009 Life Science Program, the course is made up of “Individual and Society”, “My Unique Home” and “Yesterday, Today and Tomorrow” themes. Under these themes, objectives that will help students to develop basic life skills and positive personal traits and that will help students to gain knowledge for their future social studies, and science and technology lessons can be found (Geçit, Şeyihoğlu & Kartal, 2011). When the objectives under the “Yesterday, Today and Tomorrow” theme are examined, what leaps out is that the objectives are about students establishing connections between the past and the future and about shaping the future. It is extremely important for teachers to determine which teaching methods and techniques they will use to teach the objectives included in the program. Effective learning environment is not an environment where students passively listen to the lesson but is rather an environment where students actively participate in the lesson and act like researchers when necessary (MNE, 2009). The interaction environment the

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teacher creates and the teaching methods and techniques the teacher will use during the teaching process will affect both the teacher success and the student success (Hamurcu, 2000). In Life Science, teachers generally use methods and techniques like lectures, question-answer, field trips, case study and brain storming (Şahin & Güven, 2016). In his study where Aykaç (2011) examined the methods and techniques teachers use in Life Science, he found that teachers rarely use techniques like station, six thinking hats, talking circle and producing ideas.

One of the teaching techniques used in the constructivist approach is the Predict-Observe-Explain (POE) technique. Developed at the University of Pittsburgh, the predict-observe-explain technique was initially named demonstrate-observe-explain (DOH) technique (Kearney, Treagust, Yeo & Zadnik, 2001). Developed by White and Gunstone (1992), POE technique consists of three steps (cited in Kearney et al., 2001). In his 2004 study, Kearney outlined POE steps. According to Kearney (2004), during the predict stage students present their predictions about the results of the experiment that will be conducted on the next stage. During the observe stage, students observe the scientific facts they conducted or observed in the experiments, and during the explain stage students compare their observations with their predictions and explain with their own information. In the POE technique, students' prior knowledge, ideas, beliefs and attitudes are effective in constructing new knowledge and interpreting new observations. What students learn are not always what the teacher predict (Liew & Treagust, 1995). In 2001, Kearney et al. stated that POE technique can be used in computer environment with the support of multimedia. Kearney et al. (2001) defined POE as a technique where student predicts the result of the demonstration, states his/her prediction with reasons, observes the demonstration and explains the differences between his/her predictions and observations. The use of POE technique in computer environment can be advantageous in providing more time to teachers for interaction with their students, monitoring the steps by working with smaller groups and in encouraging social interaction between students (Kearney et al., 2001). In addition to being an effective method aiming to measure the skill to apply knowledge, the POE technique teaches students to think scientifically in their daily lives and enables students to reach knowledge by using scientific process (Akgün, Tokur & Özkara, 2013).

When the literature is reviewed, it is seen that there are many studies where the POE technique was used. Some of these studies are presented below:

In the study titled “*Düzeltici Metin ve Tahmin-Gözlem-Açıklama Stratejilerinin Öğrencilerin Bilişsel Çelişki Düzeyleri ve Kavramsal Değişimleri Üzerindeki Etkisi*” (*The Effect of Refutational text and Predict-Observe-Explain Strategies on Students’ Cognitive Conflict levels and Conceptual Changes*), Akgün and Deryakulu (2007) aimed to examine the effect of two different conceptual change strategies on students’ various variables.

Akgün et al. (2013) examined the effect of activity based strategies on student objectives in their study titled “*TGA Stratejisinin Basınç Konusunun Öğretimine Olan Etkisinin İncelenmesi*” (*Investigating the Effect of POE Strategy on Teaching Pressure Subject*).

Köse, Çostu and Keser (2003) aimed to present POE method to teachers and researchers and develop activities in their study “*Fen Konularındaki Kavram Yanılgılarının Belirlenmesi: TGA Yöntemi ve Örnek Etkinlikler*” (*Determination of Students’ Misconceptions in Science: Activities Through POE Method*).

Aydın (2010) wanted to determine the effect of POE technique on eliminating students’ misconceptions and attitudes towards the Science and Technology course in her thesis titled “*Fen ve Teknoloji Öğretiminde Tahmin-Gözlem-Açıklama Tekniğinin Kullanımının kavram yanılgılarının giderilmesine ve öğrenci başarısına etkisinin araştırılması*” (*Examining the Effect of Using the Predict-Observe-Explain Technique in the Teaching of Science and Technology on Eliminating Students’ Misconceptions and Achievement*).

In her study titled “*Hücre Zarından Madde Geçişi ile İlgili Kavram Yanılgılarının Tahmin-Gözlem-Açıklama Yöntemiyle Belirlenmesi*” (*Determining the Misconceptions about the Passage of Substances Through the Cell Membrane using the Predict-Observe-Explain Technique*), Harman (2014) aimed to determine science teacher candidates’ misconceptions about the passage of substances through the membrane using the Predict-Observe-Explain technique.

Bilen and Köse (2012) researched the effect of activities based on POE strategy Science teacher candidates’ conceptual achievement and attitudes in their study named “*Yapılandırmacı Öğrenme Teorisine Dayalı Etkili Bir Strateji: Tahmin-Gözlem-Açıklama (TGA)*” (*An Effective Strategy Based on the Constructivist Theory: Predict-Observe-Explain*).

In her study called “*Tahmin-Gözlem-Açıklama Stratejisinin Fen Laboratuarında Kullanımı: Kükürdün Molekül Kütlesi Nedir?*” (*The Using of Prediction-Observation-Explanation Strategy in Science Laboratory: What is the Sulphurs Molecular-Weight?*), Tekin (2008) aimed to design

science experiments based on POE strategy and to qualitatively evaluate the results of one of these experiments.

In “*Tahmin – Gözlem – Açıklama Destekli Proje Tabanlı Öğrenme Yönteminin Çevre Sorunlarına Yönelik Tutum ve Davranışlara Etkisi*” (*The Effect of Project Based Learning Method Supported by Prediction – Observation – Explanations on the Attitude and Behaviors Towards Environmental Problems*), Güven (2014) strived to determine the effect of project based learning method supported by predict-observe-explain method in the teaching of environmental problems on attitude and behaviors towards environmental problems

Bilen and Aydoğdu (2010) researched the effect of activities based on POE strategy on Science teacher candidates’ conceptual achievement and attitudes in general biology laboratory in “*Bitkilerde Fotosentez ve Solunum Kavramlarının Öğretiminde TGA Stratejisinin kullanımı*” (*Using the Predict-Observe-Explain Strategy to Teach of Concepts Photosynthesis and Respiration plants*).

Çelik (2013) aimed to eliminate primary school teacher candidates’ misconceptions about the subject of gasses and to determine the effect of POE technique on their attitudes towards the course in their study titled “*Sınıf Öğretmenliği Öğrencilerinin Gazlar Konusundaki Kavram Yanılgılarına Tahmin Et-Gözle-Açıkla Tekniğinin Etkisi*” (*The Effect of Predict-Observe-Explain (POE) Technique on the Misconceptions of Prospective Elementary Teachers about the Gases*).

Some of the international studies on POE strategy are given below: Liew and Treagust (1995) aimed to explain how to use the POE method while teaching expansion and evaporation of liquids in their study called “*A Predict-Observe-Explain teaching sequence for learning about students’ understanding of heat and expansion of liquids*”. In their study called “*Student and Teacher Perceptions of the use of multimedia supported predict- observe- explain tasks to probe understanding*”, Kearney et al. (2011) explain student and teacher perceptions of the use of multimedia supported POE method.

Kibirige, Osodo and Tlala’s study (2014) titled “*The Effect of Predict-Observe-Explain Strategy on learners*” Misconception about Dissolved Salts aimed to determine the effect of POE strategy on the teaching of dissolved salts.

When the literature is reviewed, it is seen that most of the studies on POE technique were on the use of the technique in Science. The technique was not used in other courses. Multimedia supported POE activities are found in the foreign literature. Yıldırım and Maşeroğlu’s (2016) study titled “*Predict-Observe-Explain-Based Activities in the Association of*

Chemistry with the Daily Life and Student Views” draws attention to the association of the technique with daily life. In the present study, the researchers aimed to develop activities appropriate to POE technique that would make students relate chemistry to daily life, to implement these activities and to determine students’ views on this process. Another result of the literature review is that the POE technique was mostly used with high school and university students. The technique was not researched at the elementary school level.

The purpose of this study is to determine the effect of using multimedia-supported predict-observe-explain (POE) technique in the teaching of Yesterday-Today-Tomorrow theme of 2nd grade Life Science course on students’ achievement. Another purpose of the study is to examine the effect of multimedia supported POE activities on students’ ability to relate what they have learned to their daily lives. In addition, the study aims to put forth students’ views on multimedia supported POE technique.

METHOD

Research Design and Procedure

Quasi-experimental research method was used in the study. From school administration, the researchers learned that the students were distributed equally among the classes in terms of student achievement. Since the students were going to learn the subjects for the first time, their readiness levels were assumed to be equal, pre-test was not administered. Students’ performance grade averages of Life Science were analyzed with Mann Whitney U test to check whether there was a significant difference between the groups or not.

Table 1. *Experimental and control groups’ achievement level before the implementation*

Mann-Whitney U Test				
Group	N	Median	IQR	P
Experimental	15	7	2	0,124
Control	15	6	4	

Since there was no statistically significant difference between the groups ($p > 0,01$) according to Table 1, the implementation began, and at the end of the 26 hours of implementation (four hours a week) “Achievement Test” and “Association with Daily Life Test” were administered. During the implementation, experimental group had their

classes with multimedia supported POE technique and the control group with the activities the Ministry of National Education suggested.

Study Group

The sample of the study was made up of 30 2nd grade students attending a low socio-economic elementary school in Hatay's district of Altınözü during the Spring semester of 2017-2018 academic year. In the study, the effect of multimedia supported POE technique on student achievement on the subjects of Yesterday, Today, Tomorrow theme and on students' skills to relate what they have learned with daily life was determined. The class 2-A was neutrally assigned as the control group (N=15) and class 2-B as the experimental group (N=15). The experiment lasted 30 hours, including the administration of the "Achievement Test" and "Association with Daily Life Test".

Multimedia Supported Predict-Observe-Explain Activities

During the research process, first a literature review was conducted. Then, after objectives from the Yesterday, Today, Tomorrow theme were chosen according to their appropriateness to the POE technique, videos appropriate to the objectives were chosen and visually supported activities were developed. In order to control the clarity and applicability, the activities were implemented to three 2nd grade students attending another elementary school. After the last revisions, the implementation process with the study group started. During the Predict stage of the implementation, worksheets with questions related to the subject were distributed to the students, and the students were asked to answer the questions based on their predictions. They were not provided with feedback regarding the answers they have given. During the Observe stage, students watched videos related to the subject. Finally, during the Explain stage, students were given the same worksheet. They were asked to compare their predictions with the observations they made in the video and to answer questions related to the subject.

The researchers carried out the activities based on the multimedia supported predict-observe-explain technique developed by them in the experimental group and activities and implementations suggested by the Ministry of National Education in the control group. While developing the activities based on the POE technique, the researchers kept the theme objectives in mind and took two class teachers' and one university faculty member's opinions. These experts stated that the activities and the videos in the POE Technique's observe stage were appropriate for the purpose of the study. The objectives related to the activities are presented in Table 2.

Table 2.*Objectives Related to the Activity*

Objective Number	Objectives Related to the Activity
1	Recognizes the changes he/she went through in time by comparing the behaviors he/she could or could not do alone and in previous years.
2	Researches the games the family elders play when they were young and recognizes the difference by comparing these games with the games he/she plays with friends.
3	Compares the differences between the acceptable professions of the past and today.
4	Explains the radical changes made under the leadership of Atatürk by using visual materials.
5	By observing the states of water, comprehends that water does not disappear but only changes its state.
6	Observes the solid, liquid and gas states of matter and categorizes the matter based on his/her observations.
7	Researches the phenomena that occur as a result of the rotation of Earth both around itself and the Sun, and differentiates the similarities and differences between these.
8	Researches what the living organisms need to survive.

Data Collection Tools

In the study, “Achievement Test” and “Association with Daily Life Test”, developed by the researchers were used.

Achievement Test

To determine the student achievement about the subjects, “Achievement Test”, developed by the researchers, was administered. During development phase of the test, a draft form with 40 questions equally covering the objectives of all subjects was developed, and this draft was administered to all 3rd grade students in the same school (N= 45) by their class teacher. In addition to the three class teachers the draft form was administered, opinions of a total of eight experts including three class teachers working in another school, a Turkish teacher and a university

faculty were taken, and the “Achievement Test” with 20 questions was finalized. In the analysis of the Achievement Test, each question that was answered incorrectly or left blank were given “0” (zero) points and correct answers “1” (one) points. The lowest possible score from the test was “0” (zero) and the highest was “20” (twenty). The distribution of Achievement Test questions according to objectives is presented in table 3.

Table 3. *Distribution of “Achievement Test” questions according to objectives (Table of specifications)*

Objectives	Question Number	Number of Questions
Recognizes the changes he/she went through in time by comparing the behaviors he/she could or could not do alone and in previous years.	1, 2, 3, 4	4
Researches the games the family elders play when they were young and recognizes the difference by comparing these games with the games he/she plays with friends.	5, 6, 7	3
Compares the differences between the acceptable professions of the past and today.	8, 9	2
Explains the radical changes made under the leadership of Atatürk by using visual materials.	10, 11, 12	3
By observing the states of water, comprehends that water does not disappear but only changes its state.	14	1
Observes the solid, liquid and gas states of matter and categorizes the matter based on his/her observations.	13, 15	2
Researches the phenomena that occur as a result of the rotation of Earth both around itself and the Sun, and differentiates the similarities and differences between these.	16, 17	2
Researches what the living organisms need to survive.	18, 19, 20	3

Association with Daily Life Test

In order to determine the effect of multimedia supported POE technique on students' skill to relate what they have learned to their daily lives, "Association with daily Life test" with 10 questions was developed by the researchers by taking the opinions of a total of eight experts including six class teachers, one Turkish teacher and a university faculty. While developing the Association with Daily Life Test, Association with Daily Life Questions in the Teacher Guidebooks of Ministry of National Education were utilized. In the analysis of the Association with Daily Life Test, each question that was answered incorrectly or left blank were given "0" (zero) points and correct answers "1" (one) points. The lowest possible score from the test was "0" (zero) and the highest was "10" (ten). The distribution of Association with Daily Life Test questions according to objectives is presented in table 4.

Table 4. *Distribution of "Association with Daily Life Test" questions according to objectives (Table of specifications)*

Objective	Question Number	Number of Questions
Recognizes the changes he/she went through in time by comparing the behaviors he/she could or could not do alone and in previous years.	1, 2	2
Researches the games the family elders play when they were young and recognizes the difference by comparing these games with the games he/she plays with friends.	3	1
Compares the differences between the acceptable professions of the past and today.	4	1
Explains the radical changes made under the leadership of Atatürk by using visual materials.	5	1
By observing the states of water, comprehends that water does not disappear but only changes its state.	6	1
Observes the solid, liquid and gas states of matter and categorizes the matter based on his/her observations.	7	1
Researches the phenomena that occur as a result of the rotation of Earth both around	8,9	2

itself and the Sun, and differentiates the similarities and differences between these.

Researches what the living organisms need to survive. 10 1

In order to determine 2nd grade students' views on multimedia supported POE activities done in Life Science, students in the experimental group were asked to write their views on paper, and the findings obtained were evaluated by the researchers.

Data Analysis

In data analysis, to determine whether mean, median and mode values show normal distribution or not, coefficient of kurtosis and skewness was examined by looking at the values. Kolmogorov-Smirnov coefficient was calculated. It was determined that while achievement test scores showed normal distribution in both groups, Association with Daily Life Test scores did not show normal distribution. For this reason, Independent t test was used for the data analysis of Achievement Test and Mann Whitney U test for Association with Daily Life Test.

FINDINGS

In order to determine whether there was a statistically significant difference or not between the Achievement Test score averages of experimental group that learned the Yesterday, Today, Tomorrow theme with the POE technique and the control group that learned the theme with the activities suggested by the Ministry of National Education, first the researchers looked whether the groups showed normal distribution or not. By calculating the Kolmogorov-Smirnov coefficient, it was determined that both the experimental group ($D(15)=0,199, p=0,115$) and the control group ($D(15)=0,196, p=0,126$) showed normal distribution. Then, the effect of the POE technique used in the experimental group on students' Life Science achievement was determined by analyzing groups' mean from the Achievement Test using Independent t-test. Groups' mean regarding Achievement Test, standard deviation and t-test results are presented in Table 5.

Table 5.Independent t-test results regarding Achievement Test score averages

Administered Test	Groups	N	\bar{X}	Sd	T	P
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	Experimental	15	9	2,39	
AT					-2,94
	Control	15	6,53	2,20	0,01

When Table 5 is examined, it is seen that while the Achievement Test score averages of experimental group students were =9, control group test averages were =6,53. Therefore, there was a statistically significant difference between groups' Achievement Test score averages ($p < 0,05$). This difference is in favor of the experimental group where the POE technique was used.

In order to determine whether there was a statistically significant difference or not between the Association with daily Life Test score averages of experimental group that learned the Yesterday, Today, Tomorrow theme with the POE technique and the control group that learned the theme with the activities suggested by the Ministry of national Education, first the researchers looked again whether the groups showed normal distribution or not. As a result of the Kolmogorov-Smirnov coefficient calculations, it was found that while the experimental group showed normal distribution ($D(15)=0,184$, $p=0,182$), control group did not ($D(15)=0,265$, $p=0,006$). Since one of the groups did not show normal distribution and since the group numbers were smaller than 30, groups' score averages were analyzed with Mann-Whitney U test to determine whether there was a statistically significant difference between the groups or not. The results are presented in Table 6.

Table 6. Mann-Whitney U Test results of Association with Daily Life Test score averages

Mann-Whitney U Test				
Group	N	Median	IQR	P
Experimental	15	7	2	0,124
Control	15	6	4	

When Table 6 is examined, it is seen that there was no statistically significant difference between the Association with Daily Life Test score averages of the experimental group that learned the Yesterday, Today, Tomorrow theme with the POE technique and the control group that learned the theme with the activities suggested by the Ministry of National Education ($p > 0,05$).

At the end of the implementation, experimental group students were asked to write their opinions regarding the activities based on the POE technique on paper. For anonymity, students names were coded and written as Student 1 (S1), Student 2 (S2), etc. Some of the student views are given below:

S1: Loved it. I had so much fun. I never got bored.

S2: Had fun, learned lots of things. You showed us how the Earth turns on the computer. I was very happy.

S4: Had so much fun. I loved it. It was good.

S5: We had so much fun. We watched movies. We wrote our predictions.

S6: I had fun while learning a subject. I liked it when we were doing the activities. Learned beautiful things. I learned so easily.

S7: Loved it while having lesson. Thank you for making us watch a video during the class because I learned easier. You taught us good things.

8: I had so much fun in class. I had a lot of fun while writing during the activities, I learned. I loved the videos.

S12: I had a lot of fun during the activity. I liked the lessons. I easily understood because of the videos.

S13: I was very happy while doing the activities. It was good to watch the Earth in class. Living things were beautiful. I wish it didn't finish.

S15: The lessons we had were great. We had fun and they were very good. We learned a lot and we knew the answers.

When students' views are examined, it is seen that students do not have any negative opinions on multimedia supported POE activities. Indeed, their statements show that they enjoyed the activities. Especially watching videos in class had a positive effect on students' attitudes.

DISCUSSION and CONCLUSIONS

In this study, it was aimed to determine the effect of using multimedia-supported predict-observe-explain (POE) technique in the teaching of Yesterday-Today-Tomorrow theme of 2nd grade Life Science course on students' achievement and their skill to relate what they have learned to their daily lives. According to the findings obtained from the implementations done towards the purpose of the study, there was a statistically significant difference between the scores of experimental group where the POE technique was used and the control group where the activities suggested by the Ministry of National Education were used in favor of the experimental group (Table 4).

Another finding obtained in the study is that there was no statistically significant difference between the Association with Daily Life Test score

averages of the experimental group that learned the Yesterday, Today, Tomorrow theme with the POE technique and the control group that learned the theme with the activities suggested by the Ministry of National Education. This result may be due to the fact that activities suggested by the Ministry are successful in the subject of Association with Daily Life. One of the studies on the implementation of POE technique is the study conducted by Yıldırım and Maşeroğlu (2016) who examined the effect of activities based on the POE technique on students' skill to relate what they have learned with their daily lives. In their study, Yıldırım and Maşeroğlu (2016) determined that activities based on the POE technique has important effects on students' skill to relate chemistry knowledge with their daily life.

When students' views on activities based on the POE technique are examined, it is seen that all students stated that they enjoyed the classes that has activities based on the POE technique. Therefore, teaching with activities based on the POE technique positively affects students' attitudes towards the course. This result is consistent with the results of both Yıldırım and Maşeroğlu's (2016) and Tekin's (2008) studies that collected students' views on the POE technique.

Suggestions

In this study, the effect of activities based on the POE technique in 2nd grade Life Science on student achievement was examined, and it was found that the use of POE technique in classroom positively affect student achievement. Thus, it is suggested to use the POE technique in Life Science to teachers in order to increase achievement.

The study was conducted with 2nd grade students and was limited with the 'Yesterday, Today, Tomorrow' theme of Life Science. It is recommended to research the effectiveness of the POE technique in other themes and in different grade levels.

According to the study findings, students expressed that they found the activities with the POE technique enjoyable. Seminars can be organized to inform teachers how to use the POE technique in the classroom.

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