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Full Length Research Paper

Evaluation of use of Graphics Interchange Format (GIF) animations in mathematics education

Esra Altintas^{1*}, Şukru Iğün¹ and Soner Kucuk²

¹Department of Mathematics and Sciences Education, Faculty of Education, Kafkas University, Kars, Turkey.

²Nenehatun Vocational and Technical Anatolian High School, Iğdir, Turkey.

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This study investigates opinions of Grade 12 students about the use of Graphics Interchange Format (GIF) animations in mathematics lessons. It explores the ways of making mathematics easier and more understandable for students by demonstrating whether or not GIF animations that emerged from the integration of technology into mathematics education appeal to students both visually and educationally, and how mathematics education can be made more visual and educational through GIF animations. Here, survey model was selected and used from research models. The research sample consisted of forty-one science students in two schools (Anatolian High School and Science High School) affiliated to the Ministry of National Education in Iğdir in the 2016-2017 academic year. 20 GIF animations taken from various local and foreign sites were used as materials. For data gathering, an evaluation form was used in which the participants were asked to assess whether the GIFs were educationally and visually competent, and if not, to express their reasons. The results revealed that five GIF animations were visually inadequate in general by students whereas ten GIF animations were found to be educationally inadequate. The students stated that the reasons for visual inadequacy were: containing foreign words, being too fast, being slow and boring, being colorless and not being understandable. The reasons for educational inadequacy were: not being academically clear and understandable, being confusing, lacking numerical values, writings not being in Turkish, and being irrelevant to everyday life. Students said that they encounter GIF animations more in social media, and were surprised to see GIF animations used in mathematics education, but after the application they thought that it would be useful.

Key words: GIF, mathematics education, geometry, visibility, instructiveness.

INTRODUCTION

Learning environments that are changing along with technological and scientific developments bring into

question multi-learning environments that appeal to more than one sensory organ and require interaction with the

*Corresponding author. E-mail: hoca_kafkas@hotmail.com.

student. In addition, it enriches teaching environments by facilitating the design of teaching materials suitable for different student characteristics, and creates efficient learning environments by facilitating access to teaching environments (Akkoyunlu and Yilmaz, 2005).

A substantial amount of money is spent on technology by schools, families and policymakers with the hope of improving educational outcomes (Bulman and Fairlie, 2016). This is because the ability of students to use information and communication technologies effectively and efficiently can be achieved through the integration of these technologies into classroom environments (Ozan and Tasgin, 2017). In order to be able to educate individuals who access and use information, teachers should use educational technologies effectively in the teaching-learning process, have necessary knowledge, skills and attitudes, and also have teaching environments equipped with adequate educational technologies (Adiguzel, 2010).

Today, the use of technology in educational environments is generally done through computers. Computers are of great importance in terms of bringing abstract mathematical concepts to the screen and materializing them (Baki, 1996). The recall rate of the information presented in a computer environment is 50% or more, and all of the learning styles other than motion and sensory behavior are realized better in the computer environment. This is because the activities in the virtual environment assist motor behavior in grasping reality (Karadogan and Arslan, 2004).

The ability to move mathematical formulas, relations, and algorithms to the screen facilitates analytical understanding while enabling symbolic and graphical transitions. As calculations, solutions, models, graphics are transferred to electronic environments; they lead to new insights, predictions, generalizations and discoveries (Baki, 2006). Computer-aided visualization of mathematical operations and algorithms that are difficult to understand and explain facilitates learning. At this point, some changes and different points of view in mathematics education have taken place. One of these changes is the use of animated Graphics Interchange Formats (GIFs) in mathematics education. Animated GIFs have recently gained more popularity on social networking sites. But even with advances in video technology and access to higher bandwidth connections, tiny low-resolution, silent, motion pictures are increasingly popular online. These animated images named as Graphics Interchange Format (GIF) have become a common part of everyday Internet life. Animated GIFs play increasingly important roles in social media, delivering breaking news, telling stories through photo-journalism, and enabling new ways to express emotions (Bakhshi et al., 2016).

Animation, interpreted as visualization in Turkey (Bingol, 2004), is the artificial animation of many pictures and graphics within certain scenarios (Celik, 2007;

Bingol, 2004). The feeling of motion is created by juxtaposing same images and graphics with small differences and displaying these rapidly, and animated images and graphics enable us to obtain videos that are impossible to capture in real life due to their size, speed and complexity (Bingol, 2014). GIF animation is a kind of picture, which is created by displaying a sequence of frames (Karadogan and Arslan, 2004), composed of several pictures where we see these pictures in sequence (Bulbul and Ilgun, 2015). Today 'GIF' is typically used to mean an animated GIF file or an otherwise short, silent, looping, untitled moving image. It has a creator who is unknown or deemphasized; it is encountered by an individual viewer on a personal screen where it is surrounded by text and other media; and it is shared casually as a form of identity-making, known as a cinema of affiliation (Eppink, 2014).

In the study of Maruya et al. (2016), it was concluded that using a visual stimulus was found to have a significant effect. Animation presentation was found to provide understanding of information and to facilitate learning. Animations must be slow and clear enough for observers to perceive movements, changes, and their timing, and to understand the changes in relations between the parts and the sequence of events (Tversky et al., 2002).

In their study, Bulbul and Ilgun (2015) showed 20 Animated GIFs to 75 teacher candidates and identified some GIFs as adequate and others as inadequate (4, 7, 12 and 20). Being incomparable, lack of clarity, faintness, not having a purpose, not being interesting, lack of information, discoloration, unnecessary drawing, not using three-dimensional drawing, uneven size or smallness, amateurism of drawings were identified as causes of visual inadequacy. For educational inadequacy, lack of information, being too fast, inappropriate level, wrong information, missing explanation, wrong arrangement, lack of detail, not being catchy, not being fit for every situation, not being provided in a known context, and foreign words were prominent causes of inadequacy. When these inadequacies were evaluated, not being clear, discoloration, being confusing, not being attention grabbing, and being too fast were specified for visual inadequacies; while not being at the appropriate level, not being focused, lack of detail, not having a purpose, insufficient duration, wrong information and missing information were brought forward as causes of educational inadequacy.

The current study is important in terms of exploring the ways of making mathematics easier and more understandable for students by demonstrating whether or not GIF animations that emerge from the integration of technology into mathematics education appeal to students both visually and educationally, and how mathematics education can be made more visual and educational through GIF animations. In addition, it is

thought that this study will serve as a reference for making GIFs more suitable, organizing GIFs for mathematics education, and production of new GIFs that are more suitable for their purpose, by revealing advantages and disadvantages, both educational and visual, of GIFs that can be used in mathematics lessons in accordance with the views and opinions of the students. Moreover, because of the lack of such studies in Turkey, it is also innovative and it is thought to contribute to the body of literature. The purpose of this study is to investigate the opinions of Grade 12 students about the use of animated GIFs in mathematics lessons. From these explanations, the problem statement of this study can be expressed as follows: What are the opinions of students about GIF animations used in mathematics lessons? The sub-problems are as follows:

1. What are the ideas of students about GIFs as visual and educational?
2. What are the visual inefficiency reasons of students about GIFs?
3. What are the educational inefficiency reasons of students about GIFs?
4. What are the evaluations of students about animated GIFs in the consequence of interviews?
5. Is there a significant relation between the evaluations of students about GIFs? (In terms of visual and educational efficiency)

METHODOLOGY

Research model

In this study, survey model was used from research models. Survey models describe a situation in the past or present as it is. The individual, subject or object that is being investigated is defined as it exists in its own conditions, and no effort is made to alter or influence it. The important thing is to be able to observe and determine what is being investigated in an appropriate way (Karatas, 2012). In order to investigate the effectiveness of GIF animations in the 12th grade mathematics education of secondary schools, to demonstrate both the visual and educational shortcomings and advantages, and to guide those who will benefit from these GIFs as well as to present the features to be looked for in existing GIFs, the written feedbacks obtained from the evaluation forms filled out by the participant students were evaluated and the problem statement of the study was attempted to be answered.

Population and sample

The population of the present study was composed of 12th grade students in science classes of all Anatolian and Science High Schools in the city of Igdir. The sample of the research consisted of a total of forty-one 12th grade students who receive education in science classes in two schools (Anatolian High School and Science High School) affiliated to the Ministry of National Education in Igdir in the academic year of 2016-2017. The participants were senior students at high schools and they were seventeen years old. Fifteen of the participants were male and twenty six of them were female. In order to ensure that participants' responses to GIFs are more reliable, the study was conducted during the undergraduate placement exam preparation period after the transition to higher

education examination, towards the end of the semester. The study has been carried out with mathematics teacher candidates before by Bulbul and Ilgun (2015), and evaluations of high school students on the topics regarding the GIF animations have been taken within the scope of the present study. In this study, the related GIF animations will be assessed by students as both visual and educational advantages and disadvantages will be revealed. The students who attended the present study were from Anatolian and Science High Schools in Turkey. The students were settled to these schools by an exam called the exam of transition from primary to secondary education. The students in these kinds of schools are successful and selected students. In obtaining reliable data about GIFs, it is important to work with these kinds of students. This is the reason why purposive sampling was used in the present study. Purposive sampling involves selection of rich cases in terms of information in the context of the purpose of the research for making in-depth investigation (Buyukozturk, 2012).

Materials and research process

GIF animations were shown to students using Power Point software. Each GIF animation was placed on a separate Power Point slide, and assigned a number. Each GIF was watched twice by students. In the first viewing, no explanation was given for the related GIF, and after the second viewing, all students were asked to give their opinion, that is, discuss the subject that the GIF was about, its deficiencies and good aspects. On top of this, sufficient time was awarded and participants were asked to write their thoughts in the specific section for the relevant GIF animation. Same procedure was followed for all GIFs. No information and comments were given during the application, and the teacher performing the application acted only as a guide. The mathematics teachers of the so called students made the application mentioned and got the evaluation forms from students at the end of the application. While getting the ideas of students, the same math teachers noted the answers of students. Within the scope of the research, 20 GIF Animations were used as materials. These GIFs were taken from various domestic and foreign sites and their sources are listed below for guidance to readers (Table 1). These GIFs were preferred because they were very common in various digital environments (especially social networking sites) and were compatible with the high school curriculum. These GIFs, which teachers and students will often come across and want to benefit from in mathematics education, have been evaluated in terms of their visual and educational adequacy and shortcomings within the framework of this study. In this context, it is thought to be a guide for both teachers and students.

Data collection tool

As a data collection tool, a GIF evaluation form prepared by Bulbul and Ilgun (2015) aiming to reveal the participants' opinions about GIFs was used. In this evaluation form, participants were asked to evaluate whether the 20 GIF animations used in the study are educationally and visually adequate, and if not, to express the reasons. That is, the evaluation form was divided into 2 sections, "Visually" and "Educationally", and each section had adequate-inadequate choices and a comment section that could be filled out for any option. The participants were asked to write their opinions in these sections. The reliability analysis of the evaluation form was made for the present sample. The Cronbach alfa value was found as 0.865. It means that the reliability of it is quite high. The evaluation form is as seen in Figure 1.

Data analysis

In this study on whether the GIF animations that can be used in the

Table 1. Subject and access information of used GIFs.

Subject of GIF	Source accessed
1. Derivative of Sinus	https://onedio.com/haber/calculus-dersinde-ogretilenden-daha-iyi-matematik-konsepti-anlatan-gifler-351429
2. Matrix transposition	https://en.wikipedia.org/wiki/File:Matrix_transpose.gif
3. Radiant	https://en.wikipedia.org/wiki/Radian#mediaviewer/File:Circle_radians.gif
4. Hyperboloid	http://media.tumblr.com/c89bb90680fdc87ecd132937bf01b0e9/tumblr_inline_n78cu4p15H1s1jww5.gif
5. Outer angles of polygons	https://onedio.com/haber/calculus-dersinde-ogretilenden-daha-iyi-matematik-konsepti-anlatan-gifler-351429
6. Sin & Cos	http://www.akampus.com/matematik-derslerinde-size-yardimci-olabilecek-birbirinden-ilginc-11-gif
7. Hyperboloid	https://onedio.com/haber/calculus-dersinde-ogretilenden-daha-iyi-matematik-konsepti-anlatan-gifler-351429
8. Hyperbola	https://giphy.com/gifs/hyperbola-13fQobpekBVfMs
9. Pythagorean Theorem	https://giphy.com/gifs/animated-math-nerdgasm-FGN3UskNkgG76
10. Factorization	http://image.mathcaptain.com/cms/images/40/foilmethode.gif
11. Ellipsis	https://giphy.com/gifs/educational-ellipse-Qk5flr8LRYACI
12. Reimann Sum	https://giphy.com/gifs/math-mathematics-calculus-zTGUIIASZx83u
13. Tangent Lines	https://giphy.com/gifs/make-finance-mNc1D6DZJ7dkY
14. Pascal triangle	https://en.wikipedia.org/wiki/Pascal%27s_triangle#mediaviewer/File:PascalTriangleAnimated2.gif
15. Pi number	https://commons.wikimedia.org/wiki/File:Pi-unrolled.gif
16. Projection	https://onedio.com/haber/calculus-dersinde-ogretilenden-daha-iyi-matematik-konsepti-anlatan-gifler-351429
17. Circle Projection	http://www.businessinsider.com/7-gifs-trigonometry-sine-cosine-2013-5
18. Conversion from Cartesian to multiple coordinates	https://en.wikipedia.org/wiki/User:LucasVB/Gallery#mediaviewer/File:Cartesian_to_polar.gif
19. Parabola	https://giphy.com/gifs/educational-definition-parabola-rVKNdcrBEihUs
20. Sin & Cos Triangles	https://giphy.com/gifs/make-finance-CqLieMymr6ztk

12th grade mathematics education of secondary school are visually and educationally adequate, in which GIFs that are deemed inadequate are justified by the students, percentage distributions of the answers were performed with the aim of providing a guide for both teachers and students. In addition, deficiencies have been identified by taking into account the comments made by students regarding GIF animations that were deemed visually or educationally inadequate.

FINDINGS

In order to determine the adequacies related to GIF animations, the evaluation form was applied to the student groups in the two schools as a data collection tool. Adequate-inadequate options for each GIF animation to be evaluated educationally and visually were taken into account, and the percentage, frequency table was prepared (Table 2). Looking at Table 2, it can be seen that GIFs 16, 13, 20, 10, and 5 were deemed visually inadequate by a majority of the students as indicated by the analysis based on the adequate-

inadequate options. Educationally, GIF animations 16, 4, 7, 5, 17, 8, 15, 18, 2 and 20 were found to be inadequate. In order to enable a high level of utilization of GIF animations, a threshold of 35% and above was set, and GIFs that were found to be inadequate were listed. In addition, when the overall responses were taken into account, GIFs 3, 9, 14, 12, 6 and 19 were found to be considerably adequate on the visual scale. GIFs 9, 12, 3, 6, 14 and 19 were found to be considerably adequate on the educational scale. In addition, looking at the comments given by students for each corresponding GIF animation in the evaluation form, the reasons for visual inadequacy can be listed as shown in Table 3. Looking at Table 3, the reasons for visual inadequacy and the percentages of answers are as follows: containing foreign words (10%), being too fast (11%), being slow (7%), boring (11%), being colorless (8.3%) and not being understandable (53%). Also, looking at the comments given by students for each corresponding GIF animation in the evaluation form, the reasons for educational inadequacy can be listed as shown in Table 4.

* Üniversite, fakülte, bölüm, anabilim dalı, il, ülke

** Üniversite, fakülte, bölüm, anabilim dalı, il, ülke

GIF Evaluation Form						
GIF	As Visual			As Educational		
	Sufficient	Insufficient	Because...	Sufficient	Insufficient	Because...
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						

Figure 1. GIF evaluation form.

Table 2. Percentage frequency distribution of the data obtained from the evaluation form.

GIF animation	Categories							
	Visually				Educationally			
	Adequate		Inadequate		Adequate		Inadequate	
	f	%	f	%	f	%	f	%
1. Derivative of Sinus	32	78	9	22	30	73	11	27
2. Matrix Transposition	29	70	12	30	27	65	14	35
3. Radiant	40	97	1	3	33	80	8	20
4. Hyperboloid	33	80	8	20	24	58	17	42
5. Outer angles of polygons	27	65	14	35	25	60	16	40
6. Sin & Cos	36	87	5	13	33	80	8	20
7. Hyperboloid	31	75	10	25	24	58	17	42
8. Hyperbola	29	70	12	30	26	63	15	37
9. Pythagorean Theorem	38	92	3	8	34	82	7	18
10. Factorization	27	65	14	35	30	73	11	27
11. Ellipsis	34	82	7	18	29	70	12	30
12. Riemann Sum	37	90	4	10	34	82	7	18
13. Tangent Lines	26	63	15	37	28	68	13	32
14. Pascal Triangle	38	92	3	8	33	80	8	20
15. Pi Number	35	85	6	15	26	63	15	37
16. Projection	23	56	18	44	18	43	23	57
17. Circle Projection	31	75	10	25	25	60	16	40
18. Conversion from Cartesian to multiple coordinates	33	80	8	20	26	63	21	37
19. Parabola	36	87	5	13	33	80	28	20
20. Sin & Cos Triangle	26	63	15	37	27	65	14	35

* Üniversite, fakülte, bölüm, anabilim dalı, il, ülke

** Üniversite, fakülte, bölüm, anabilim dalı, il, ülke

Table 3. Reasons for visual inadequacy

Reasons	f	%
Containing foreign words	7	10
Being too fast	8	11
Being slow	5	7
Boring	8	11
Being colorless	6	8.3
Not being understandable	38	53

Table 4. Reasons for educational inadequacy.

Reasons	f	%
Not being academically clear and understandable	32	41
Being confusing	13	24
Lacking numerical values	9	12
Writings not being in Turkish	6	8
Being irrelevant to everyday life.	12	15.3

Looking at Table 4, reasons for educational inadequacy and the percentages of answers are as follows: not being academically clear and understandable (41%), being confusing (24%), lacking numerical values (12%), writings not being in Turkish (8%) and being irrelevant to everyday life (15.3%).

In the interviews made with students in both schools after the application, students stated that they encounter GIF animations more in social media, they were surprised to see GIF animations used in mathematics education, but after the application they thought that it would be useful. When the students were asked for the reasons for this, they stated that specific topics and graphical changes that are extremely difficult and time consuming to draw, that need to be demonstrated in a step-by-step manner, or explained in a way where the verbal definition is given but no concrete example is provided, actually become more understandable via GIF animations.

Based on the interviews made in the classroom, it was found that the most intriguing and educational GIF animations according to the students were the ones related to Riemann sum, derivative of sinus, exterior of polygons, factorization, angles, Pi number, Pascal triangle, radiant and Pythagorean theorem. For example, in the GIF animation related to Riemann sum, when the area between the function and the axes is calculated, the difference in the area can be clearly seen by the students as the number of rectangles drawn increases. Another point that draws the attention of students related to this GIF is that rectangles can be drawn with different dimensions. GIF animation related to the derivation of the sinus function corresponds to the geometric representation in multi-representation. The most common criticism raised for this GIF by students was that it was

Table 5. Chi-square independence test related to evaluations of students about GIFs.

Parameter	Value	p
Pearson Chi-Square	570,185	0.000

too fast. Pythagorean theorem is a theorem that is frequently confronted in the secondary education curriculum and said to be simple, but often not fully understood by the students. In this study, the GIF animation that demonstrates the relationship between the Pythagorean theorem and area-volume was found to be educational and interesting by the students.

Looking at Table 5, it can be said that there is a significant relation between evaluations of students about GIFs (in terms of visual and educational efficiency) ($X^2=570,185, p<0.01$).

CONCLUSION AND SUGGESTIONS

The current study questions the usability of GIF animations, a technological tool that is rarely used in mathematics education. GIFs 16, 13, 20, 10, and 5 were deemed visually inadequate by a majority of the students. Educationally, GIF animations 16, 4, 7, 5, 17, 8, 15, 18, 2 and 20 were found to be inadequate. In addition, when the overall responses were taken into account, GIFs 3, 9, 14, 12, 6 and 19 were found to be considerably adequate on the visual scale. GIFs 9, 12, 3, 6, 14 and 19 were found to be considerably adequate on the educational scale.

Based on the application and the data obtained, it was found that using GIF animations can be useful in learning mathematical concepts, algorithms, relations and structures. In addition, visual and educational inadequacies and deficiencies of some existing GIF animations used in this study were identified. To repeat these, it can be listed as being too fast, containing foreign words, being slow and boring, lack of numerical values, being confusion, being colorless, not being clear and understandable, and not being related to everyday life. Also, there is a significant relation between evaluations of students about GIFs (in terms of visual and educational efficiency).

The current study is in line with Maruya et al. (2016) and Tversky et al. (2002) because of the students' views that GIF animations can be useful to learn mathematical concepts, algorithms, relationships and structures, that is, to facilitate learning and enable perception. The study is also in line with Bulbul and Ilgun (2015) due to the students' reasons that GIFs contain foreign words, they are slow, they are not clear, they are confusing, they are discolored and they are boring.

Within the scope of the current study, the following recommendations can be made:

(i) One of the conclusions of the literature review is the limited number of GIF animation examples for mathematics education. This leads to problems such as using GIF animations, recognizing and accessing them. This situation is one of the reasons that led to this study. One of the recommendations that can be expressed in this context is the diversification and development of GIF animations that can be used in education by people who are in the field of mathematics education (especially academics, teachers, etc.). In the process of teacher training and in-service training given to teachers, how to prepare a GIF animation on any mathematical subject or concept can be included in the curriculum within the scope of Technological Field Information or Material Development courses. If the most common misconceptions in the literature are investigated, the subjects on which GIF animations need to be prepared can be identified. Increasing amount of academic work on GIF animations and the sharing of findings and results of these studies will allow for better utilization of GIF animations.

(ii) New GIF animations can be created in class activities via group work with the help of applications about concepts and subjects that are not understood or hard to understand. Thus, students are actively involved in learning activities. In addition, project or performance tasks can be given on mathematical concepts after the necessary preliminary information is provided.

(iii) In today's rapidly changing and developing world, in order to keep up with this change and development, we have to raise who can understand mathematics, know the terminology of mathematics, use mathematics knowledge and skills in daily life problems, have basic mathematical

skills such as problem solving, association and reasoning, who are able to analyze, and generalize by making assumptions. One of the most important conditions to fulfill this obligation is to use technology in mathematics education correctly, in place and effectively. Educational materials should also show development in parallel with technology. The fact that materials in mathematics education are abundant and useful makes it easy to transfer information as well as to activate learning environments. Learning will be permanent if the material used has visual and educational characteristics that are relevant to the topic. In order to create educational environments that are suitable for their purpose, it is necessary to employ computers in general and Internet and software applications in particular.

(iv) Taking into account the results of the research carried out, it is recommended that the necessary arrangements be made in line with the views submitted on the relevant GIFs or the establishment of new GIFs in this respect. It is also recommended that appropriate GIFs be prepared or existing ones be translated, taking into account the foreign language levels of the participants.

(v) The so called GIFs found visually and educationally adequate can be suggested to be used by all mathematics educators from high schools and universities for better understanding.

(vi) The study is limited with 20 GIFs popular on websites and 41 students evaluating them. That is why we recommend that the number of GIFs can be increased and the participations can vary (especially academicians, teacher candidates, students in several grades...). So, GIFs can be evaluated and new mathematics materials can show up. The workbooks can be supported by CDs full of GIFs from different topics in mathematics.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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Full Length Research Paper

Spanning professional and academic: The changing identity of professional administrators and managers in Hong Kong's higher education context

Cheng Tak-lai

Department of Childcare, Elderly and Community Services, The Hong Kong Institute of Vocational Education (Sha Tin),
21 Yuen Wo Road, Sha Tin, New Territories, Hong Kong.

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This paper builds on Whitchurch's notion of the 'blended professional' which aims to examine how mixed professional activity affects professional administrators and managers' identity disposition in universities in Hong Kong. In response to complex missions and demands of contemporary higher education globally, diverse projected-oriented professional managers have emerged in universities and are dedicated to a wide range of short- and long-term funded projects. Certainly, Hong Kong is no exception. The distinction between academic and non-academic staff has become less prominent for these managers who work across and between university functions. Yet, amongst discussions, Hong Kong – even in Asian Country – has received scant attention. By drawing empirical data from three professional managers currently working in a Hong Kong university' research and development centres, this qualitative paper investigates through Whitchurch's framework, how professional activities affect their identity disposition at their workplaces in Hong Kong context.

Key words: Blended professional, professional identity, identity disposition, narrative identity, administrator, third space.

INTRODUCTION

In the past decade, studies have emerged concerning professional administrators and managers' identity disposition. Responding to globalised world and rapid changes in the higher education environment, increasing numbers of multi-professional administrators and managers requiring a different blend of skills and responsibilities have emerged and crossed universities' various boundaries.

However, at the same time their role and identities in higher education might problematize the organisational

culture of university (Birds, 2014; 2015). As administrators and managers' role and duties in Hong Kong universities have been scant concerned, the present paper specifically addresses the conceptual framework 'blended professional', that is, professional managers who span academic and professional domains, as a 'heuristic device' (Whitchurch, 2008a) to research how professional activities affect their identity disposition at universities in the Hong Kong context. Before delving directly into identity disposition, the paper provides a brief

E-mail: t.l.cheng@lancaster.ac.uk. Tel: +44 (0)1524 593572.

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background of contemporary changes to universities in Hong Kong. After reviewing literature related to the significance and emergence of professional managers who span academic and professional domains, the paper then outlines Whitchurch's conceptual framework of the blended professional and takes it into account in analysing narratives of three cases in public-funded Hong Kong universities.

A brief background: Contemporary changes of staff structure in universities in Hong Kong

With the growing pressure for enhancing own global competitiveness, many governments in the Asia and Pacific region expect universities to contribute significantly to the innovation agenda, and therefore have expanded their higher education systems in the past decades (Chan et al., 2017; Mok, 2016; Mok and Neubauer, 2016). Hong Kong is no exception (Lee, 2016; Lo and Tang, 2017; Kember, 2010). The latest policy paper 'Governance in UGC-funded Higher Education Institutions in Hong Kong' (UGC, 2015) has highlighted challenges faced by Hong Kong universities nowadays:

In the 21st century, therefore, universities play a central role in economic and social development. No longer, as in previous centuries, can they be regarded as remote ivory towers distanced from the everyday world of the new globalised economy. On the contrary, the contemporary university must engage with this world and therefore must interact with a much wider variety of legitimate stakeholders than was the case only a generation ago. All of this means that universities have grown in complexity as well as in scale. This has created new challenges both for the internal management of universities, but also for the way in which they manage their interactions with the wider society (UGC, 2015).

Probably, the golden age of higher education probably has passed (Taylor, 2008). Universities are no longer viewed as ivory towers of intellectual pursuits and truth seeking but enterprises that peruse the world-class status in association with benchmarking and university rankings (Altbach, 2012; Marginson, 2014). With the quest for regional education hub and pressing educational demand in the globalised world, universities themselves have inevitably undergone several distinguishable transformations in response to challenges of internal management for admission mechanisms, student support, funding and so on (Ng and Tang, 2016), while their staff structure at the same time has changed, and non-academic staff has become correspondingly more important. According to a statistical table from Hong Kong University Grant Committee, the number of non-academic staff employees has increased steadily in the

past decade. In 2005, approximately 3,700 administrators and technical staff, about one-third of the total employment, were working non-academically in funded higher education sectors (UGC, 2016a). After 10 years, an extra thousand staff member has been recruited, and in 2015, the proportion of non-academic staff had risen to 40% of total employment (UGC, 2016b). However, the statistical table mentioned earlier does not reflect the distribution of staff members' functions and positions. In this circumstance, these apparent changes in staff profile display, at least some degree, the non-academic staff as being important to institutional development, but their situation is being under-developed.

Changing role and identity of professional administrators and managers

Pre-determined roles and duties, in accordance with staff organisational structure in universities, are no longer the major source of non-academic staff's identity disposition. For the sake of institutional development and innovation, universities have expanded partnerships with communities and enterprises by conducting various broadly based, wide-ranging institutional projects related, for instance, to support and welfare, enterprise partnership and professional development (Whitchurch, 2012).

Consequently, for reasons of governance and management, universities nowadays tend to adapt a more flexible staff model in facilitating innovative development (Whitchurch and Gordon, 2013). Colleagues with academic credentials or professional experience may be employed on non-academic or split contracts for projects in academic department or faculties. As such, universities' workforce is becoming more diversified (Whitchurch, 2010b). This is a response to interests of external agencies and necessary translational functions amongst academic agendas (Whitchurch, 2010a). The binary distinction of academic and non-academic staff is therefore no longer clear-cut; instead, increasingly multi-professional administrators and managers have emerged in projected-based areas and have shifted away from traditional bureaucracy towards a more networked and collegial ways of working (Kolsaker, 2014; Veles and Carter, 2016).

Concurrent with institutional developments, non-academic staff's role and duties, is increasingly complicated and no longer limited to general office work (Graham, 2012; Jisun and Jung, 2015). The occupational structure is less prominent as an expression of identity disposition for multi-professional administrators and managers who have established themselves as hybrid workers, crossing function areas and developing fields of knowledge in universities (Altbach, 2012; Whitchurch 2006).

In regard to this phenomenon, Whitchurch (2008b) has

conceptualised their territory as 'third space', spanning academic and professional domains: 'it is not necessarily co-located geographically and virtually in institutional structure but characterised by a wide range of short-term or long-term projects such as bidding for external funds and quality initiatives'. To examine the broader view of possible trends in the identity movement of professional administrators and managers, Whitchurch (2009) launched a seminal work. This research interviewed 54 multi-professional administrators and managers from the United Kingdom, Australia and the United States, evidencing that their identity disposition is significantly affected by their interpretation of personal academic background and responsibilities, and activities in the workplace.

Changes to universities' organisational structure in recent decades mean that a new framework is required to provide better understanding of colleagues' identity dispositions in higher education (Henkel, 2010). It is significant for further researches because how they view their roles at higher education institutions is a central success factor for their work (Ryttberg and Geschwind, 2017). Therefore, straightforwardly categorising multi-professional administrators and managers into 'non-academic staff' no longer provides insight into the shift of identity disposition in universities, but downplays the discourse of staffing nomenclature (Sebalj et al., 2012).

Amongst limited discussions, in-depth projects related to professional administrators and managers' identity disposition in Hong Kong universities-even in other Asian universities-have been invisible and remained susceptible to uncertainty during the last decade. However, they stayed tuned to the regional position and education policies of higher education in Hong Kong (Cribbin, 2015; Lee, 2014; Tang, 2014; Mok, 2016; Mok and Neubauer, 2016).

To fill the gap, this paper used the conceptual framework of the blended professional as a heuristic device (Whitchurch, 2008a) to examine three professional managers' narratives about how their identity dispositions are affected by work spanning professional and academic domains in universities in the Hong Kong context. Such a study can not only improve our limited understanding of former identity disposition, but also generate useful implications for the situation of contemporary higher education.

Narrative identity: Space, knowledge, relationship and legitimacies

This paper deploys the narrative approach because institutional context has been regarded as an important ethnographic accounting of implications for researching professional administrators and managers' identity dispositions. In fact, this approach has frequently been used in many disciplines to study participants' identity dispositions, for instance, university teachers (Cheng,

2016), public health nurses (Dahl and Clancy, 2015), mental health services users (Grant et al., 2015) and Chinese diaspora families (Fong, 2013). Because identity is constituted by 'our interpretation of ourselves, and our experience is constitutive of what we are' (Taylor, 1985), informants' narratives not only describe events, but also identities of those involved (Kenny et al., 2011). In this sense, when identity disposition's storied lives evolve, with complexity and meaningful interaction with significant others over a period of time in specific contexts, the narrative approach can serve as a significant tool to illuminate how identity disposition of professional managers is affected in universities in the Hong Kong context.

In higher education sectors, professional activities are inevitably affected by the system in which they are situated, and this circumscribes work groups' interactions and beliefs (Trowler, 2008). Unlike acting out fixed roles in pre-determined job descriptions, this interactive process affects identity disposition and comprises certain contextual factors like building communicative relationships and networks in universities (Whitchurch, 2008a), occupational practices, cultures and values (Szekeress, 2011), the ideology of an individual's discipline (Fanghanel, 2009), personal niche knowledge and technical expertise (Whitchurch, 2006) and even personal background (Bitzer and De Jager, 2016). Because the link between institutional context and changing identity disposition has been under-theorised (Trowler, 1998), and because we lack developed theory of the nature of professional administrators and managers' identity disposition, this paper relied on respondents' narratives. Therefore, also, it borrowed the conceptual framework of the blended professional (Table 1) as a filter for analysing three professional administrators and managers' identity disposition by recounting vignettes of interaction in their workplaces.

METHODOLOGY

Qualitative case studies

This qualitative paper permits 'inquiry into selected issues in great depth with careful attention to detail, context and nuance' (Patton, 2002). Because identity disposition relies on how interviewees' interpret reality and how they perceive themselves in first-person perspective within their contexts (Henkel, 2000; Hsieh, 2016; Sadovnikova et al., 2016), a case studies approach is employed. Case studies can 'catch up the close up reality and thick description of participants' lived experiences of, thoughts about and feelings for a situation' (Cohen et al., 2007).

Purposive sampling is used here because selecting information-rich cases can generate insight and understanding of the central phenomenon (Creswell, 2008). Considering that the nomenclature 'manager' is not used in standardised position classification scales amongst institutions (Sebalj et al., 2012), contact was purposely made to project-based managers who had at least 5 years' full-time experience at positions in academic departments affiliated centres in Hong Kong's public-funded universities.

However, difficulties were encountered in identifying blended

Table 1. Conceptual framework of blended professionals.

Dimensions of professional activity	Identity dispositions
Spaces	Offer multiple understandings of the institution; Accommodate ambiguities of third space between professional and academic domains; Re-define and modify professional space and boundaries; Work around the formal structure
Knowledge	Embed and integrate professional and academic knowledge; Undertake research into institutional activity; Create interactive knowledge
Relationship	Enter and understand academic discourse/debate; Form alliances with key partners; Facilitate autonomy of own staff; Construct professional internal and external networks
Legitimacies	Offer academic credentials; Achieve credibility in academic debate/space; Challenge the status quo; Manage the duality of 'belonging' and 'not belonging' to academic space

Source: (Whitchurch, 2008b; 2009).

professionals because project-based managers rarely have sufficient work experience; they often leave a position after the funded project ends. Therefore, as the opportunity arose, snowball sampling was adopted (Creswell, 2008), but only when suitable interviewees (working in higher education sectors for over 10 years) were referred by another interviewee.

Data collection

Interviews were conducted in April 2017, to discover how professional activities affect the identity disposition of blended professionals in universities in the Hong Kong context. To avoid unwieldy and superficial perspectives in results, three cases drew on semi-structured interviews, which allow participants to guide the interviews' direction to capture their perceptions and experience's complexities across dimensions of professional activity. Guided by the conceptual framework, interviews covered selected topics, that is, interviewees' understanding of the workplace, academic space, relationship between external and internal parties, and knowledge application. For instance, on the relationship between external and internal parties, interviewees were asked to share work relationships between academics and key parties, experience in networking internally and externally and so on. Ethical approval was obtained, and participants were informed of the inquiry's purpose and method before the interview commenced. Individual interviews were conducted in a conversationally and lasted approximately one hour. All interviews were audio-recorded and conducted in Cantonese, so participants felt comfortable conversing and expressing their concerns in their first language. Interviews were then transcribed in verbatim for further analysis. Next, to enhance this study's credibility, transcriptions were translated into English, and sent to participants for further comments.

Data analysis

Data analysis was situated in an iterative, dynamic and recursive process, in which the author moved amongst data, the theoretical framework and the research question (Strauss and Corbin, 1998). Practically guided by the coding steps and process introduced by Creswell (2008), informational segments were labelled with 32 codes after preliminary exploration of the data's general sense through reading scripts in their entirety and writing memos. After deductively coding the entire text within the theoretical framework

and later inductively coding iteratively, similar codes were further aggregated to form themes and provide information on how interviewees perceived themselves within each dimension of professional activities. As mentioned, 'the informants' narrative not only describes events, but also describes identities of those involved'. Thus an attempt is made to use the framework to interpret the study's findings with vignettes that represent the range of dimension of professional activities, and illustrate placement of interviewees' identity disposition through interaction in Hong Kong university workplaces.

FINDING

In this section, three participants'-Gary, Herman and Watson (pseudonyms)-interviews are reported. Narratives arising from case materials are themed according to the blended professional concept (Whitchurch, 2009). Accordingly, four dimensions, namely, spaces, knowledge, relationships and legitimacies are identified in this paper. However, these dimensions are intertwined and, in practice, are likely to occur in parallel.

Spaces: Accommodating the ambiguities of third space between professional and academic domains

For interviews, respondents crossing professional and academic spaces in universities were sought. All acknowledged that in addition to teaching and research, they have functioned as third pillars in university development. For instance, Herman stressed that his role is to compensate for academics' inadequacy in front-line experience. Unlike research, academic and administrative positions, respondents evidenced contributions to industry and community through applied research and projects. At the same time, however, they very often must accommodate their positions'

ambiguities in the workplace:

Although I thought that I was an academic staff member in the early stage of my reporting duties as a project manager. This idea was dismissed while I was managing a funding project. The host organisation doesn't regard me as academic staff by regulation of application, because the definition of academic staff was referred to as only those who have taken up teaching duties full-time in universities (Watson)

I doubt my position in the university.... Our roles are of paramount importance as we transfer academic knowledge and professional experiences we acquired back to the university by putting them into practice.... Nevertheless, we are in a dilemma when facing academics and other organisations. On one hand, academics may not agree to the need of putting professional experience into practice and treat us as those who run errands.... On the other hand, it remains uncertain how external organisations comprehend our 'professional knowledge' and what it represents (Gary)

Respondents also reported that clear demarcation exists between professional and academic staff in university (for further discussion, see finding on 'relationship'). Members from academic departments and faculties are seldom involved in other units' duties and vice versa. For instance, Herman admitted that he preferred to take up small-scale research activities with his centre members, rather than cooperating with those from academic departments. This 'us' and 'them' perception occurred throughout all three interviews. All respondents even acknowledged that their main duty was to develop professional projects for front-line practices, rather than to conduct small-scale research; but they still mean that they have taken part in academic activities in the unit. Moving back and forth between domains in the workplace evidenced ambiguities of the third space they attempt to accommodate.

Knowledge: Embedding and integrating professional and academic knowledge

Unlike other administrative staff members in a university, blended professionals can have less technical expertise in an accredited speciality, for instance, human resources and estate management. Instead, respondents showed the importance of embedded professional and academic knowledge:

'Education' was not my major study.... Although courses and subjects available in universities are not directly linked to my current occupation, it's still related to my academic background, and so I am

able to have academic discussions with academic communities from China, Hong Kong and Taiwan (Watson).

Respondents were dedicated to development of front-line strategies and practices that rely on both their professional expertise and academic knowledge. Thus, embedding serves as a two-way street between the university and the broader community. That is, on the one hand, blended professionals develop university projects based on academic knowledge; on the other hand, they bring back project experience for consolidation through institutional publication or presentation. As Gary stated:

For me, 'academic' refers to the process that combined the use of theories, logic and empirical study in pursuing the truth and producing knowledge.... Unfortunately, under the current system in the university, 'academic' only represents issues related to job posts. When we write a funding proposal or encourage the education industry to carry out a reform, I also need to collect data and participate in academic-related work like academic seminars, essay writing and editorial work for consolidating projects' experience (Gary).

Apart from Watson and Gary, Herman also declared that professional managers are expected to have niche knowledge with specific applications in the institution, for example, tutoring, coaching, community outreach, industry innovation and broad bundles of activity in relation to student affairs on and off campus. These extracts illustrate that managers integrate professional and academic knowledge in an interactive and practical way because they bring expertise and experience from outside higher education into the university, and meanwhile apply academic knowledge to projects outside higher education in the community.

Relationship: Exercising the hierarchical relationship relying on staff organisation structure

In their interviews, Watson and Gary said that they have constructed professional networks and formed alliances with key partners externally. For instance, Watson has been nominated as a committee member of certain professional associations in China and Hong Kong, while Gary is a panel adviser of an education bureau. However, internally, when they were invited to share relationships with academic staff members, all of them revealed that they rarely contacted academic staff members in universities:

Only one or two academic staff members who are close with donors or funders are important to my work. Otherwise, there isn't conflict or a relationship between them and me.... (Gary)

There is no subordinate relationship between academic staff members and me. In case we must work with an academic department, like taking up teaching duties, I just need to contact departmental administrators (Herman)

It is an alienated relationship. We are busy with our own staff, respectively. Normally I do chitchat with my friends who are on the academic staff. But there is no collaboration unless projects strictly require their involvement (Watson).

Interviews demonstrated that respondents work around the formal structure and tend to exercise relationships by relying on the hierarchy of staff organisational structure. This tendency was also reflected when Watson came into contact with academic staff members from other universities:

They treat me as academic staff as well.... However, I would try to explain to them I am not an academic staff, indeed, as universities in Hong Kong have precisely classified academic staff and professional staff. At least, in my perspective, academic staff refers to those responsible for teaching and conducting research in universities. In this sense, I don't think I am positioned in the group of academics (Watson)

This clear demarcation also gives rise to disputes between project-based professional managers and executive staff, as Herman shared in his observation:

According to the staff organisational structure from the human resources office, project-based managers have been categorised into the group 'Administrative and Support Staff'. Therefore, how administrative and executive staff members understand my role is rather important....

Despite lack of interaction with academic staff, the relationship with executive staff is crucial to project-based managers (further discussed in finding legitimacies). For example, according to Herman, conflicts have arisen because the executive staff might not understand the nature of blended professionals, but still apply hierarchical bureaucracy's dull rules to them in daily operation, especially because they are in the category of 'Administrative and Support Staff'.

Legitimacies: Building legitimacies through personal academic credentials

Respondents showed that their legitimacies depended on personal academic credentials. Frankly, here, the crucial personal academic credential is the doctorate. As Watson pointed out:

As I have already completed a doctorate, most of the university students and colleagues regard me as a scholar rather than a professional manager.... If I had not yet completed my doctorate, I cannot imagine how my duties could be done smoothly in my workplace.... In Hong Kong, most people have much regard for the title 'Dr'. They treat you as an expert regardless of your academic focus, or whether it is irrelevant to your work content.

On the contrary, for those who have completed only a dedicated master's programme, their legitimacy in the university has been challenged by various stakeholders internally and externally. The job title could not give them credibility in the workplace or in academic debate. As Gary stated:

When I first contact the external organisation, it is unavoidable to introduce myself with my job title. As such, I must make extra effort to earn their trust and show my professionalism because my duty is to improve the school setting based on my personal academic judgement.... In case they don't trust you and your professionalism, they might not follow your idea and even take over the project I am in charge of. However, legitimacy is based on academic qualification, that is, a doctorate, either a Ph.D. or Ed.D. If you don't have a doctorate, those stakeholders or academic staff who do think they are in charge of the project instead of you.

A similar struggle also occurred when respondents interacted with administrative and executive staff during daily operations. As Herman explained:

A doctorate is significant to our legitimacy in the workplace.... The executive staff recognises only those colleagues who have obtained a doctorate. For instance, last time we had to work as a team in organising a conference, the executive staff assigned the honourable duties at the reception to those managers with doctorates, while the others were assigned to technical support, like video and photography, etc.... I have had resentment against these arrangements, indeed, because one of my duties is to network external parties throughout industries. Especially in a previous partnership programme, though I was just a technician because he had seen that I was responsible for taking photos in another conference. Regarding my dignity and professionalism, I was totally discomfited by this experience....

Personal academic credentials are of capital importance in building legitimacies and responding to the challenge of the status quo for professional managers. The doctorate tends to be strictly prerequisite for professional managers in

establishing their discipline and credibility in lateral relationships with colleagues and stakeholders inside and outside the university.

Institutional context beyond professional activities

As mentioned earlier, institutional context has significant bearing on professional activities (Trolwer, 2008). Respondents' identity disposition was affected by institutional structure and senior management's leadership. First, for the structure, institutional operation that is quite specific to each university and the bureaucratic procedures to a greater extent relied on its size and scale (Schubert and Yang, 2016), for instance, Gary indicated how it influences rule systems and activities in which he is involved:

Like me, situated in a relatively small-scale university in Hong Kong, all our projects' operations must follow institutional procedures and guidelines. For instance, to invite some visiting scholars for professional projects, in my past working experience in a university comprised of various faculties, the financial office would assign a responsible officer to my unit for handling issues with flexibility, as they understand that expenses for visiting scholars differ amongst departments like medicine and art. On the contrary, (now that I am) situated in a relatively small-scale university, the entire proposed budget must follow the standard guidelines of the finance office. It is a structural problem influencing the competitiveness and quality of projects.

In addition to structure, institutional context shapes, but is also shaped by individuals as well as by senior management's vision and leadership (Delanty, 2008; Kenny et al., 2011). In other words, leadership agency and his qualities are important to drive institutional transformation in times (Howells et al., 2014). The three respondents all revealed that their roles and identity disposition are closely tied to senior management's rule system and leadership. They stayed in their current positions almost entirely because they can still exercise autonomy in the workplace and because their personal goal is partly consistent with the head of unit. As Herman and Gary stated:

Respect and trust from the head of unit is the main reason that I took this position. It is significant to me.... I quit my job and have taken the role of project manager because the direction of the head of unit is same as mine, with strong passion and knowledge of the speciality; various individuals would work for him, but not for the salary (Herman).

The staff grading of head of unit is crucial regarding

my job status. For example, recently, I was developing a proposal that suggests rebuilding the garden and office-the presupposition is that, at the same time, the office nearby must be relocated. In the cross-board meeting, if your unit head is not positioned in senior management and not supporting you, colleagues in other departments treat you in respect to your staff grade; in this sense, normally, most of your suggestions will be ignored or abandoned (Gary)

Apart from the institutional structure and senior management's leadership, the funding sources for their salary should not be overlooked. Market values of Hong Kong's higher education have become more prevalent within the academy than in the past (Cheung et al., 2010). Whether to obtain funding or to maintain market competitiveness in recruitment, external pressures from the market and even research funders are now translated into internal pressures. Facing funding-linked evaluative policies and practice changes, market imperatives and institutionally defined notions are exerting strong influence on Hong Kong universities' structure and activities (Lin, 2009). Unlike the academic staff whose salary is largely separated from institutional entrepreneurial activities, managers and administrator are under threat and in order to survive they have to participate proactively in the funding-linked institutional activities (Yang, 2012):

Honestly, (even if the unit is self-funded) the university can help you survive it will. For example, the senior management or president could offer funding sources to help you to sustain your position and projects in the unit...as both the university and industry need the projects we have developed. Therefore, our centre will not be closed in a short period of time. Honestly, we are the largest and one of only two university centres in Hong Kong providing these kinds of professional projects.... (Herman)

If the position is UGC-funded, those colleagues who work continuously for over 6 years in the same occupation will be offered tenure, through which the salary package is subsidised by the government. In contrast, project-based managers are employed on a self-funded basis; therefore, employment continuity depends entirely on project status. These two financial principles directly influence the nature and work attitude of colleagues. For example, like me, the position is self-funded. Therefore, my chief work duties are to develop funding proposals and to organise charge activities for the steady income of my unit, and thus to ensure my position can be continued in the next academic year (Gary).

Instances of the contextual situation involve institutional structures and leadership's notions. Probably, background characteristics identified here might be seen as the limitation of this paper, and further attention to be paid to them. However, this might also serve as a reminder that in any identity study, institutional context should not be overlooked. Merely focusing on professional activities might under-determine the impact of contextual influences and institutional positioning in responding to global academic changes.

Conclusion

Informed by the blended professional concept, this study aims to arouse the academic concerns and adds to the current limited knowledge of how professional activities affect identity disposition in Hong Kong universities. The study sought to revisit contemporary discussions of professional administrators and managers' identity disposition. The paper proposed individual narratives as important ethnographic accounts for researching identity disposition, which was impacted by how they perceived interactions and professional activities in the workplace.

Based on Whitchurch's conceptual framework, professional activities were unpacked into four dimensions-spaces, knowledge, relationships, legitimacies-for analysing project-based professional managers' identity disposition. On one hand, findings indicated that in the Hong Kong context, the blended professional was affected by dully exercised hierarchical relationships as determined according to staff organisational structure. Blended professionals' legitimacies are mainly built on personal academic credentials.

On the other hand, a rich institutional context was found for identity disposition existing beside the professional activities that have occurred. In that regard, two immediate new insights arise with implications for further related studies. First, further research should consider the institutional context's impact and its cultural dispositions. Especially, university education has undergone structural changes that include funding-linked evaluative policies and practices. If we focus simply on motivation and change at the personal level and on workplace interaction, we might neglect pre-existing values and attitudes embedded in the institutional context. The second insight follows naturally from the first.

Because institutional culture is by no means a dead concept, but depends on dynamic understanding of cultural processes (Linstead, 2008), further work should unpack implications of narratives that might not be apparent at first sight. That is, further studies are recommended to induce social theories for analysing practice under institutional culture, for instance, ways in which work is organised, decisions are taken, power is distributed and the nature of values and attitudes

about the university (Dressman, 2008) to avoid institutional cultural influences being in 'great danger of becoming meaningless' (Trowler, 2008).

CONFLICT OF INTERESTS

The author has not declared any conflict of interests.

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Full Length Research Paper

Disciplinary lenses model: A new approach to collegiate-level general education

Mohammad Makhmaltchi^{1*}, Seyed Mahdi Sajjadi¹, Khosrow Bagheri Noaparast² and Hashem Fardanesh¹

¹Department of Educational Sciences, College of Human Sciences, Tarbiat Modares University, Tehran, Iran.

²Department of Educational Sciences, College of Psychology and Educational Sciences, Tehran University, Tehran, Iran.

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This work aims to study and promote a motivational model, Collegiate-level General Education that enhances students' motivation to have self-fulfillment and inherent desire to acquire diverse knowledge. In this way, students would not see Collegiate-level General Education as an obstacle to their undergraduate education, but as a great and priceless opportunity for them to be generalist lifelong learners. The research method used is deductive qualitative analysis. A variety of written texts relevant to the research topic and question were analyzed in this work. Purposive sampling was used to select the research data. It is found that each discipline has its own specific literacy or skills. Intellection or intellectual exercise in each discipline can be considered as a disciplinary lens. Through lens one can look at the world from a particular angle and therefore can read and understand a specific aspect or dimension of the world. Collegiate-level General Education puts disciplinary lenses of a variety of disciplines together to improve, broaden and deepen individuals' understanding of the world.

Key words: Disciplinary lenses model, collegiate-level general education, intellectual exercise (intellection), disciplinary literacy, disciplinary intellectual exercise, disciplinary lens.

INTRODUCTION

Collegiate-level General Education helps learners to pay attention to their intellectual abilities; it improves their reading and understanding of the world; it shapes their personalities and attitudes as well as the inner forces. In this regard, Mayer (1995: 47) believes that a noble intellectual does not only explain and interpret the world but also allow his or her behavior to be guided by the

world. When a person's understanding of the world becomes deeper, his or her understanding becomes more objective, and consequently causes his or her "self" to be strongly connected to the world. This is why a realist cannot refrain from reading and understanding the whole world and his or her relation to it. Thus, it seems that reading and understanding of the world should be

*Corresponding author. E-mail: mak@wsshpg.com. Tel: +98 912 2141690.

considered as the central concept in the educational philosophy of the society. According to Woods and Barrow (2006: 16-17), low-living conditions shall be imposed on a man who has a rootless existence and is unaware of the reality of his relation to the world. On the necessity and importance of Collegiate-level General Education, Liedman (2010: 546-547) believes that, in high school, the student must learn different subjects such as English, History and Mathematics, and must master their principles enabling him to solve any theoretical problem. These multidimensional capabilities must be strengthened at the university so that a talented student can prepare himself for study, doing research in each discipline and finding his or her path in any specific domain of knowledge.

If members of society would be expected to have general or intellectual education in the social, political, scientific, economic, etc. fields, they should benefit from the foundational knowledge in those fields. According to Brezinca (1992: 259), man must be so intellectually trained that he can choose the most fundamental of the various sensible issues. This requires the breadth of thought, which can be achieved only through acquisition of the foundations of different branches of knowledge. When a man masters the essential and foundational knowledge, he will be released from the weakness of accepting everything with ease. Without knowing the generalities and foundations of each branch of knowledge at the collegiate-level, one will not have proper and correct understanding of that knowledge. According to Kneller (1990), without gaining mastery of scientific and collegiate topics and subjects, man would remain alone with no companion in the realm of reality; while by mastering and benefiting from them, one can prevail over realities and use them for various purposes.

Research question

The research question is thus: "What is the motivational model for Collegiate-level General Education?" An examination of this will help to re-orient students' perception of Collegiate-level General Education. Rather than viewing it as an obstacle in their undergraduate education, students will see it as a great and priceless opportunity for them to become generalist lifelong learners.

METHODOLOGY

This research uses deductive qualitative analysis; deep analysis was done and the main concepts and themes of the data were analyzed. The research sample consisted of variety of written text relevant to the research topic and question. The data collected from them are considered as raw data for this research; they were condensed into themes or categories. Sampling in this research

was conceptual or theoretical. In fact, theoretical sampling was indeed purposeful sampling as data segments of the texts were selected to ensure its relation to the research topic and question as well as the relevant concepts, which in this regard are the most informative data segments selected to inform the research question. Each data segment (text chunk of any size) had to fit into a single theme or issue relevant to the research topic and question.

The deductive approach was used to validate and extend the conceptual framework or the preliminary model. In fact, deductive approach starts with existing data and sources plus an expected pattern, framework, model, or theory that is tested and developed by the qualitative research strategy. Qualitative analysis of content is not a new method but in recent decades, it has been used as a qualitative research technique applied to various scopes and texts. In deductive qualitative analysis, the most informative and explanatory data segments of the texts, most relevant to the research topic and question based on the researcher's preliminary model, were selected. Each segment as the unit of analysis contained only one specific single idea or theme. After assigning proper labels to them, what followed was to immerse oneself in the labeling data segments for induction inference. This is done by classifying them in respect to their relationship with a specific phenomenon. Consequently, patterns, themes or categories emerged. In this way, first the main categories were generated and then by continuing the process, most of the main categories were divided into subcategories. Through the feedback loops, the subcategories were evaluated again and consequently some of them were related to the main categories. As qualitative analysis continued, the categories were revised many times: some were decomposed, combined, deleted, and some new categories were generated. The next stage involved making sense of the identified categories as well as identifying the relationship between them and making inferences, patterns and new meanings. In this way, according to Zhang and Wildemuth, "the process of qualitative content analysis often begins during the early stages of data collection. This early involvement in the analysis phase will help you move back and forth between concept development and data collection, and may help direct your subsequent data collection toward sources that are more useful for addressing the research questions" (Zhang and Wildemuth, 2010).

COLLEGIATE-LEVEL GENERAL EDUCATION

Proper and effective education for human intellectual and rational growth is not the type of occupational, professional or specialized education, but a kind of general or intellectual education. This, according to Elias (2006: 29-30), is called Intellectual (Rational) or Cognitive Education, since it must increase the intellect or reason of individuals. It is also called general education, since it includes the most general domains of knowledge in which mastering them is expected from an individual.

Collegiate-level General Education is intrinsically and inherently general, multidisciplinary, broad, and diverse; it connects us to the whole of human knowledge and familiarizes us with its diversity and vast breadth; it does not emphasize a particular branch of knowledge. Collegiate-level General Education, which focuses on intellectual education and strengthening of intellectual capacities, capabilities and abilities of individuals, is the result of passing necessary and sufficient number of

collegiate-level general or introductory courses in various branches of knowledge, regardless of the individuals' majors or specialized fields of study. This enables them to make independent thinking and judgment, as well as making the right choices in their individual and social life. It also makes them willing and eager to continue learning throughout their lives.

Collegiate-level General Education makes individuals closer to their own maximum intellectual capacity and potential through Introductory Courses. To achieve potential perfection, an individual must actualize his or her own intellectual capacities. Also by all-round collegiate-level education, an individual can become generalist or multidimensional human being, while through one branch of knowledge, obviously he or she can only read and understand one aspect of reality and not the whole of reality. Indeed "Thinking in one branch of knowledge leads to human growth and perfection in one dimension. Hence, intellectual cultivation can only be achieved through General and all-round Education and not Specialized Education" (Research Institute of Hawzeh and University, 2005: 358-359). On the other hand, reality is not divided into different branches of knowledge; therefore, one must master the foundations or introductory courses of different branches of knowledge in order to be familiar with different dimensions of human cognition since each dimension indicates only a part of world realities. That is why, according to Newman, the extreme emphasis on a single educational field or discipline distorts man's understanding of reality, because all branches of knowledge are considered as an integrated whole; each discipline is merely considered as a segment or an angle of view or a method of dividing knowledge (Haris 1991). In fact, Collegiate-level General Education is the unifying and integrating element of different fields of study, and in general, it is the unifying element which makes specialization and expertise sensible. Jaspers (2015: 73-74) also believes that research, exploration and knowledge are divided into domains, creating an inseparable and integral whole. Therefore if any single academic discipline would be considered apart from the whole knowledge, it shall lose its profound and deep meaning.

Collegiate-level General Education makes it possible for an individual to master the basics, foundations, generalities, and introduction of various branches of knowledge, and to enjoy a wide variety of background or prior knowledge. This consequently shall enable him/her to understand different and diverse information as well as links and connections between various fields of knowledge, in order to deal effectively with issues and problems arising from the complexities of life. On the necessity of having the widest and most diverse foundational and basic information, Chateau (2009: 127) correctly concludes that Comenius would regret that the future divine nobles, political men, judges, and physicians

were unaware of metaphysics, physics and mathematics, which in his view, were the only subjects that could make their judgment and thought accurate. What he would hope for them was broad and open mindedness, as well as more and more general knowledge.

INTELLECTUAL EXERCISE (INTELLECTION)

Intellectual exercise or intellection is the process of using the intellect (Reason) and its components (concept making, meaning making, reasoning and thinking, critique, and building hypothesis and theories) to do a certain specific intellectual activity in a subject or topic. Intellectual exercise cannot be done in a vacuum, without a subject. In fact, as the eye needs light to see, intellect also needs subject to do certain intellectual exercise. Any subject, fact or idea is related to a branch of knowledge or a set of branches of knowledge, and any branch of knowledge has its own specific intellection or intellectual exercise. By doing intellection or intellectual exercise in a branch of knowledge, it will become more complete and causes cognition of the corresponding aspect of reality to be developed. According to Griese (2004: 116), intellect (reason) is the most important characteristic of man, which if it grows well, makes it possible to understand the world. Comparing intellectual exercises with bodily or physical exercises can create an effective context for a better understanding of the conception of intellectual exercises. As the human body which is unit, but has multiple capacities of bodily or physical exercises, the human intellect is also unit, and has multiple capacities of intellectual exercises. Also as each person can build his or her own body through physical or bodily exercises in various sports, he can also build his or her own intellect, through intellectual exercises in various branches of knowledge. In fact, as each kind of sport consists of specific physical or bodily exercises, also intellection in each branch of knowledge consists of specific intellectual exercises.

Reality or the external world is not fragmented, but it is indeed integrated and unified. That is why man has gradually created branches of knowledge in order to better understand reality or the external world and achieve a more complete, clear, and precise representation (product of perception of the sense-data), that is a kind of image of the world and reality. Therefore, the human knowledge is multiple; which if we would have intellectual exercises in more and more branches of knowledge, our understanding of the world and reality would become more complete, clear and precise. Each branch of knowledge has its own particular intellectual exercise because each branch of knowledge is unique, so that knowledge is made in it in a particular way. For example, each knowledge like philosophy, physics or psychology clearly has a specific method of intellection or

intellectual exercise. In this regard, Savater (2005: 21) correctly concludes that Kant believed that since philosophizing is a method, that is, the way that thought travels along it; and indeed a way of looking at things, and performing arguments, hence only philosophizing or doing philosophy can be taught, and not the philosophy!. Furthermore, according to Savator (2005: 10), philosophy is a kind of exercise of the intellect or a kind of intellectual exercise. Even Savator (2005: 15) goes much further than that and says that 'I want to think that philosophical intellect can also exist'. Thus, the intellect is single (unit), but the intellectual exercise is multiple. Hence, for example, we can speak of philosophical, psychological, sociological, physical, educational, and political intellectual exercises and so on.

General education, especially at the collegiate-level, with respect to its multidisciplinary, broad and diverse nature, is the means of intellectual exercises for cultivation of intellect. That is why, according to Krishnan (2009), in general, the tendency of educators in favor of multidisciplinary is very high, since it provides a greater scope and range of possibilities for the development of the learners' interests, abilities and strengths (Krishnan, 2009). In this regard, Locke believes that every human being has the power of intellection that can be developed and guided. What makes intellection weak is the lack of its use in the intellectual issues on a wide scale; that is, on various issues, including study of scholarly and philosophical books (Research Institute of Hawzeh and University, 2005: 207). Every human being should try to activate and fulfill his or her own potentials and capacities of multiple Intellectual exercises to make his or her own power of intellect maximized. According to Descartes (2006: 80), if it would be possible that from our birth we could have our complete and fully developed intellectual abilities, and would only follow the absolute leadership of our intellect, then our thoughts would be always firm and clean.

Disciplinary intellectual exercise (Disciplinary intellection)

The ability of a single body to do various sports is similar to the ability of a single intellect to do various disciplinary intellectual exercises. In other words, single intellect is similar to a single body, and different kinds of sports are similar to different kinds of intellections, as any discipline or branch of knowledge has its own particular intellectual exercise. That is, just as bodily exercises are different in different kinds of sports, intellectual exercises are also different in different disciplines or in different branches of knowledge. In fact, the methods or logic of reasoning, thinking, and critique, and in general, the method of intellectual exercise in different branches of knowledge are different. That is why we can talk about disciplinary

intellectual exercise, and its skill which can be called disciplinary literacy. However, if a person has a healthy body, and has the ability to do bodily or physical exercises, it does not mean that prior to necessary and sufficient training and consequently prior to gaining adequate skills in a particular sport, he or she can do that particular sport correctly. Similarly, if a person has a healthy mind, and has the ability to do intellectual exercises, it does not mean that prior to necessary and sufficient intellectual exercises and consequently prior to obtaining adequate skills in a particular branch of knowledge, he or she can do intellectual exercise in that particular branch of knowledge correctly. In fact, in the last two decades, the invention of Disciplinary Literacy, which is indeed the skill of disciplinary intellectual exercise, by Cynthia Shanahan and Timothy Shanahan, implicitly approves the existence of disciplinary intellectual exercise and consequently multiple intellectual exercises.

Skills of disciplinary intellectual exercise (Disciplinary literacy)

In every branch of discipline, knowledge is created in a particular way, and therefore each branch of discipline has its own specific conceptual framework and possesses a unique potential of epistemological power. That is why each branch of knowledge has a unique and specific perspective, and a set of specific research and thinking habits. Therefore, each branch of knowledge has its own skills of intellectual exercise or disciplinary literacy. In general, disciplinary literacy which consists of reasoning and thinking skills in each discipline shows one how to read, write, ask questions, reason, speak, solve problem as well as how to use the knowledge of that discipline, as an expert.

Disciplinary literacy was devised by Cynthia Shanahan and Timothy Shanahan approximately two decades ago for high school students to benefit from it. This is because high school students were not able to achieve necessary maturity and mastery in the branches of knowledge due to the inherent weaknesses in high school courses. According to Robertson (2014), Shanahan and Shanahan did research in a large number of fields in order to find out what kind of skills and literacy are required in a specific discipline. In fact, these two researchers have done research - along with educators of teacher training- in mathematics, chemistry, and history. One of the main findings of their research is that there are different intellectual values in each field, and therefore the methods that are used in the learning and acquisition of knowledge in each branch of discipline are different.

It seems the efficiency of disciplinary literacy at collegiate-level is much higher than its efficiency in high school level, because the closer the learners get to the

end of their high school education, the more benefit they can have from disciplinary literacy. In this regard, Zigouris (2012) believes that Snow and Moje correctly concludes that as learners progress in their education, teaching them should become more complex and discipline-based so that it can support the learners' understanding of the complex texts in each content area. Hence, the product of integrating the Collegiate-level General Education with disciplinary literacy, called General Collegiate-level Literacy, shall be the highest level of literacy that can develop one's intellect to the highest.

The most important skills of disciplinary literacy

Three most important skills of disciplinary literacy are explained below.

(1) The logic of each discipline (thinking and reasoning in each discipline as an expert): The greatest skill of disciplinary intellectual exercise or the largest component of disciplinary literacy in each discipline is the ability to think in that discipline as an expert in it. Therefore, the greatest skill of the intellectual exercise in each discipline is mastering the logic of that discipline and its particular form of thinking. In order to apply the particular thinking or logic of each discipline, it is obvious that one should master specific knowledge of that discipline, and be aware of how to reason and think in it. For example, a psychology student, through learning psychological reasoning and thinking, should be able to reason and think psychologically. In order to be able to think in a discipline, with its particular logic, it is always necessary to master the main or key ideas of that discipline - those concepts and thoughts that make psychology become psychology - which gives an integrated and unified meaning to it. Then, you must find the connection of other thoughts you confront in that discipline with those concepts and thoughts.

For the deep study and learning of each discipline, you have to learn how to think within the logic of that discipline; and also, for example in a discipline like psychology, you have to learn how to think in that discipline psychologically. Unfortunately, most learners are unaware of the logic of the discipline or the branch of knowledge they are studying, and for this reason, they are limited in understanding that discipline as a whole, in conducting independent thinking within that discipline, and applying it outside the context of the text and texture of its academic tasks (Critical thinking and teaching students how to study and learn). Hence it seems that it is a wrong attempt to create a general reading comprehension skill, since each branch of knowledge needs a specific reading comprehension skill.

(2) Critical thinking in each discipline: The prerequisite

for critical thinking in any subject or discipline is the mastery of the basic and foundational knowledge of that discipline; and for this reason, Mc Burney (2001: 11) believes that "Critical thinking cannot be thought abstractly, but it is created through specific subjects related to different scientific disciplines". It seems that due to specific epistemology as well as particular logic and reasoning of each discipline, critical thinking in each discipline is different from critical thinking in others. In this regard Meyers (1995: 2) also believes that the methods of critical thinking in different disciplines are different; for example, the way physicians deal with an issue is different from the way historians or economists deal with it; therefore, critical thinking in various disciplines must be developed in different ways. Thus, since critical thinking in different disciplines or branches of knowledge is different, learners must master critical thinking and know how to criticize what they read. In this way, critical thinking in each field is somehow interwoven with the content and knowledge of that field, and is considered as one of the most important skills in intellectual exercise of that field. Therefore, having a superficial knowledge about the subjects contained in a text is not enough for the critique of that text. Furthermore, according to Blaxter et al. (2006: 148), to critique a text, one must understand the main concept of a text and also study it in such a way that it can be evaluated by the quality of information, along with the evidence presented.

(3) Reading texts of each discipline as an expert in that discipline: According to Shanahan and Shanahan (2008), disciplinary experts read the texts in their discipline, different from the beginners or novices as well as the experts in other disciplines. For example, study and research on reading physics texts by physicists revealed that they tended to pay particular attention to new information that they did not already know, and also to the information that violated their expectations. They separated reading to learn from critical reading, reserving the latter for work that was directly applicable to their own work. Also, historians were found to engage in sourcing (paying attention to the author), contextualization (connecting text to the circumstances of the time), and corroboration (making comparisons across texts); also unlike scientists, historians did not suspend their critical stance when they read information about what they know less. Thus, the learners in the field of history should be able to read historical texts as experts, or they must be able to read, understand, analyze and criticize historical texts as history experts. They should be able to describe and explain the historical concepts and ideas contained in those texts as well as think about historical events and issues. Thus, by taking these steps, the learner achieves deeper and more meaningful learning, and consequently master historical literacy. Then he shall be considered to be historically literate, one with deep understanding of

events, with active engagement in historical texts (Wisconsin Department of Public Instruction 2016).

DISCIPLINARY LENSES

Intellection or intellectual exercises in each discipline can be considered as a lens; through each lens one can look at the world from a particular angle and can read and understand a specific aspect of the world. The main components of a lens are perception and intellection (Intellectual Exercise), and the inputs of a lens are sense-data which are perceived and converted to representations.

Representations are indeed appearance of reality made in the mind. For example, if a person stands in the middle of a railroad, and looks at the rails, he can only see the representation of the rails - which is built in his or her own mind - instead of the real rails. He mistakenly thinks that the rails, due to perception error, seem connected in the distance, while obviously in reality the rails never connect to each other. There is always a time-lag between our representations and reality (the external world) so that our observation or representation of reality always lags behind. For us reality is always the story of the past. For example, for us the sun is always the sun as it was 8 minutes ago, because the time the light from the sun reaches us is 8 min; therefore if the sun suddenly disappears, 8 min later we can realize its disappearance. Therefore, representation is not the reality itself but is only the appearance of reality made in the mind. By doing intellectual exercise on the representations, they are transformed to concepts and meanings or to cognition and finally knowledge.

Various lenses enable one to observe, read and study reality from a variety of angles. The reason that every discipline has its own specific lens or disciplinary perspective through which we view the world in a particular way, is that man has gradually designed each discipline in order to be able to study and understand objects and certain affairs or some phenomena, aspects of the external world. Each disciplinary lens can be considered as a unit of specific meaning making unit or a unit of specific intellectual exercise, and therefore, the more the number of disciplinary lenses, the more broad and extensive meaning of reality can be achieved. In this way, each disciplinary lens can be considered as a visual unit, in which it is obvious that with more visual units, one can achieve a clearer representation of reality.

Reality is integrated and unified, and is not fragmented or divided into separate and distinct parts or pieces; while human knowledge is multiple, divided and demarcated. Through each discipline or branch of knowledge we can only look at the world from only a particular perspective; in other words each discipline can provide merely a partial view of the world. Therefore, it seems that

observing life only from one lens or one perspective would neither be meaningful nor useful. In this way, the human effort should always include observing, reading and understanding the world from many perspectives and in its entirety, until his or her intellect is improved. This is because, as Gombrowicz (2011: 56) states, we can understand the universe as far as it penetrates the human intellect, merges in it and attracts it to itself. We need more lenses to gain a more general, wider, broader and deeper understanding of reality. In fact as through knowledge of only one discipline, or through only one perspective or one lens, obviously the external world cannot be entirely viewed, observed, read, and understood, and for this it needs various different perspectives and lenses. The number and strength of the lenses we use in our observation of reality affects the quality and accuracy of our observation and understanding. Therefore, every individual observes and studies reality through a unique collection of different perspectives or lenses.

Using disciplinary lenses in Collegiate-level General Education

We can study the objects and affairs of the world, through a variety of different branches of knowledge; through a variety of different disciplinary lenses and perspectives, to achieve a greater understanding of more aspects of the world. With only one discipline which can provide only a particular perspective of the world, one can merely perform intellection or intellectual exercise through only one perspective.

Through disciplinary lenses, corresponding to the collegiate-level introductory courses, or through the Collegiate-level General Education, individuals can discover their potential capacities and talents. Also, through disciplinary lenses, individuals will also be able to discover their best professional, research or specialized interests. Through disciplinary lenses, a person tries to obtain a broad and diverse collegiate-level introductory, basic and foundational understanding of various subjects for improving his or her mind and to avoid being deprived of the familiarity with them in order to use every opportunity for intellectual improvement.

Collegiate-level General Education is not one-dimensional or one-sided, but it is all-round and generalist, covering a variety of subjects, issues, and affairs. Its purpose is to create a multidimensional human being, not a single dimensional one. In fact, the development of a multidimensional human being is achievable only through Collegiate-level General Education. Establishing a firm and strong foundation for human intellections or intellectual exercises in various dimensions of human cognition, and consequently providing familiarity with various fields of cognition cause

growth and development of all aspects of human existence.

Through Collegiate-level General Education, the learner not only achieves the relationship between the fundamentals and generalities of various branches of knowledge, but also achieves synergetic insight through combination and interactions of different perspectives and lenses of knowledge. It is also possible that each of our disciplinary cognition may strengthen our other cognition. Furthermore, Collegiate-level General Education puts lenses of a variety of disciplines together, so that its multi-disciplinary structure makes the learners accustom themselves to search for diverse perspectives of the topics and issues.

Using disciplinary lenses emphasizes the role of collegiate-level introductory courses in creating and building a reliable knowledge base, which provides scholarly, academic and collegiate-level support for effective reading and deeper understanding of a variety of topics, contents (such as media contents), texts and analysis.

The allegory of the wall

In this allegory, the human mind is likened to a set of lenses installed in a wall in which reality and the external world are behind it. Imagine there is a wall full of lenses, in front of each person from birth to the end of his or her life, where reality is behind it. Through those lenses, only the representations (a kind of images that are made in the mind) and cognition of reality can be accessed. In fact, man creates the appearance of the external world in his own mind and therefore cannot observe the world itself. In this way, each person has a unique wall in front of him; and if he changes his or her place, the wall will still remain in front of him and therefore cannot be emancipated from it. Human beings are separated from reality by a wall full of lenses, which is always in front of them, and observe the world by the overall representation and cognition provided by the lenses. Instead of reality itself, humans have only access to representations and cognitions of reality throughout their life. The representations (sensory perceptions) and cognition that are indeed mental show only the appearance of reality and not the reality itself. According to Geisler (2014: 367, 50), we are limited to a kind of reality which is built both in and by our own mind; in other words knowledge is mentally created in the mind of people.

If people are told that what they access is not reality itself, but it is the representation and cognition of the appearance of reality made in their own minds which consequently are incomplete, unclear and not error-free, they will not accept. This is because from birth, they are accustomed to them. They hardly think that their cognition can be modified and become more complete

and clear. Intellection or intellectual exercise in any discipline or branch of knowledge is a kind of mental practice or mental exercise that increases the epistemic power of the corresponding lens of that branch of knowledge. Therefore, it will be made possible to achieve a more complete and clear cognition of the reality corresponding to that branch of knowledge.

The allegory of the wall somehow depicts the consequence of the inadequacy or lack of Collegiate-level General Education that can lead to the captivity of man in the appearance of reality. It expresses the fact that, neither representation nor cognition is equal to reality, because only the appearance of reality is made in the mind of man. Consequently, the knowledge derived from thinking about the appearance of reality is obviously a subjective knowledge, which always has only a degree of correspondence to the reality and to the objective knowledge contained in it. That is why man's knowledge, for example on the structure of atom is incomplete, unfinished, uncertain, fallible and transitional and far from the objective knowledge contained in the atom itself. In this regard, according to Popper (2004: 56-57), science is a human work, and therefore it is not free of error; and according to Davarpanah (2014: 33), science is a process of constant modifications and developments so that one of the most important qualities of science is its transitional characteristics. In this way, man can become gradually closer and closer to the objective knowledge contained in reality through constant modifications of human knowledge, which is subjective; however, human subjective knowledge will never completely coincide with the objective knowledge. That is why according to Popper (2004: 59), we can wish to obtain scientific facts, but can never reach certainty; and also according to Wahl (1996: 93-94) we should not expect that by scientific consideration, we can definitely reach the truth; because science is in constant transition and each day it may be modified and improved. The allegory of the wall reveals the limitations of the human nature that human beings cannot see the external world itself, but instead can only access the representation and cognition of the external world created and built in their own minds.

The implicit message of this allegory is that humans will eventually find out that it is always possible for them to access more and more complete and clear cognition of reality; and it seems that when people would find out what they access - which are mental representation and cognition (that shows only the appearance of reality) - are an incomplete, flawed and vague image of reality, but not the reality itself. In order to achieve a more complete and clear cognition of reality, they will become willing and eager to do intellectual exercise or intellection in more and more various and diverse disciplines. Thus, the allegory of the wall is not a closed system, as it shows that it is possible for man to have access to more complete and clear cognition of reality and the external

world.

Conclusion

Intellect (reason) which is innate in man is single while intellection or intellectual exercise is multiple; and hence it can be improved through education specially through general education which is multidisciplinary. In other words, human knowledge is multiple, and methods of intellectual exercise in different branches of knowledge are different. Each branch of knowledge has a unique and specific perspective while reality is integrated and not fragmented. Therefore in order to understand reality, one must master the foundations or introductory courses of different branches of knowledge.

The Collegiate-level Disciplinary Lenses graduates pay sufficient attention to current branches of knowledge; they do not only understand the basic and key concepts, principles and conceptual ideas of the disciplines, but also acquire the disciplinary literacy or the skills of intellectual exercise in each discipline. This model creates an intrinsic motivation based on the individual self-fulfillment and inherent desire for acquisition of diverse knowledge in order to read and understand the world.

Disciplinary Lenses Model can help encourage and promote intrinsic motivation which comes from within the human being because human beings are inherently and intrinsically motivated to read and understand the world and consequently enjoy mastering different branches of knowledge. This model arouses the university students' curiosity about the foundations, introductions and generalities of different disciplines and branches of knowledge, which increases the motivation for acquisition of the Collegiate-level General Education to satisfy their cognitive and knowledge needs. In this way, this model is an efficient motivational model that improves the motivation of the university students for acquisition of Collegiate-level General Education. This model quenches the thirst of the soul and mind of man that is inherently very thirsty and eager for broad and diverse knowledge in order to be able to read and understand the world. This is because understanding of the world is inherently and obviously beneficial and useful for man essentially for his individual and social needs and also for using it in his or her occupation or profession.

Each discipline or branch of knowledge has its own specific intellectual exercise, and by doing intellectual exercise in a discipline, it will be developed and will become more clear and complete. In order to be able to do intellectual exercise or intellection in a discipline, for example in order to reason or think in a discipline with its particular logic, it is always necessary to master both its content knowledge or disciplinary knowledge especially its main or key ideas as well as its disciplinary literacy.

Collegiate-level General Education which consists of intellectual exercises in different disciplines for cultivation of the intellect, puts disciplinary lenses of a variety of disciplines together, to improve, broaden and deepen our own understanding of the world, as each disciplinary lens can be considered as a unit of specific meaning making. By increasing the number and strength of the disciplinary lenses that we use, the quality and accuracy of our observation, reading and understanding of the reality shall be developed. Collegiate-level General Education through Disciplinary Lenses Model: (1) provides introduction to a wide range of disciplines for acquisition of disciplinary knowledge plus disciplinary literacy (2) provides an arena for doing disciplinary intellectual exercises in order to understand reality or the world (3) cultivates single intellect through multiple intellectual exercises (4) puts greater emphasis on the development of the intellectual abilities of students (5) provides incentive and motivation for lifelong learning in different disciplines.

The Scholarly Discipline Model that according to Newton (2000) has been developed by its advocates including Bruner, Phenix, as well as professional disciplinary societies consists of ideas and concepts that support the Disciplinary Lenses Model and its conception. According to Newton (2000), the Scholarly Discipline Model as a model of general education firstly proposes that General Education should be basically an introduction to the disciplines that comprise and give shape to the college, and secondly the strongest general education comprises a series of rigorous introductory courses in the disciplines. This is due to the fact that the organization of the university into disciplines clearly mirrors the storehouses of human knowledge. Furthermore in this regard, according to Newton's findings, the Scholarly Discipline Model provides the following main aspects, assumptions, or pedagogical approaches that support the Disciplinary Lenses Model: (1) Key insight: Disciplines as accumulated wisdom and ways of understanding the world humankind have developed over the centuries; (2) Role of the university: Vigorous developer/extender of the knowledge and methods of the academic disciplines; (3) Substance of curriculum: key concepts and methods of inquiry as defined by the disciplines; (4) Ideal graduate: Beginner practitioner of the disciplines; (5) Breadth/depth: Sharp introductions to the range of basic disciplines; (6) Source of coherence: The individual student piecing together the mosaic of the disciplines; (7) Orientation: Instills an understanding of the intellectual treasures and scholarly methods that are society's intellectual heritage.

In this regard for example in Newton's description of the Scholarly Discipline Model (Newton, 2000), the source of coherence and integration is the individual student piecing together the mosaic of the disciplines, while in the Disciplinary Lenses Model the source of

integration is reading and understanding the world; consequently it is the relevance of the disciplines to the world through combining or weaving together the perspectives, representations and cognitions of their disciplinary lenses into an integrated coherent whole lens through which the world can be viewed, read and understood more clearly and completely.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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Full Length Research Paper

A study on the reduction of the depression level and improvement of the psychological adjustment level of university students through a counseling programme, using Beck's theories of depression

Ibraheem Malii^{1*} and Basma Alshareef²

¹Department of Psychological Counseling, The World Islamic and Science Education University, Jordan.

²Department of Psychology, Al-Ahliyya Amman University, Amman, Jordan.

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This study aims to investigate the reduction of university students' depression level as well as improvement of their psychological adjustment level through a counseling programme, using Beck's Theories of depression. The sample of this study was randomly selected, and categorized into two groups: experimental and control groups. The former consists of 15 students, who were counseled in a session per week, while the latter consists of 15 students, who were not counseled. The counseling was done in 8 sessions, with 90 minutes spent for each session. This study had two variables: counseling program was the independent variable, while dependent variable was depression and psychological adjustment. The results of One-way Analysis of Covariance (ANCOVA) show that in the depression level of the students, there were significant differences between the experimental group and control group; for psychological adjustment level, there were no significant differences between both groups.

Key words: Beck's theory, depression, adjustment.

INTRODUCTION

University students encounter many problems relating to their daily activities. Such problems might lead to non-adaptive behaviors, emotions and depressive behaviors, then stress. This would require the students to seek help. Mentoring could help these students. Therefore, it is necessary to use or seek for counseling preventive programs that can help to alleviate students' depression and non-adaptive behavior (Dawood, 2001).

The most effective counseling programs are those that can show how to correct and modify one's negative thinking, using Beck's theory of depression. Beck (1987) indicates that depression is a reaction that prevents an individual from adapting to or copes with negative situations. When an individual is depressed, he or she finds it difficult to adjust to stress and also has difficulty in expressing himself or herself.

*Corresponding author. E-mail: alshareef62@yahoo.com.

According to Beck (1974), individuals encounter many problems daily that prevent them from achieving their goals. That is, the way individuals interpret and see things can help them adapt to different life situations. Therefore, every positive outcome, or negative feeling, experienced by an individual is based on his or her cognitive structure, belief system, and pattern of thoughts. If an individual's thought and thinking pattern are positive and undistorted, his or her emotion and behavior would be positive. This in turn would reflect on his or her level of psychological adjustment.

According to Burns (2000), depression was the first health problem in the world. Depression is a mental disorder that can ultimately lead to suicide. Ibrahim (1998) points out that there are three sources of depression:

- (1) Biological factors: These factors include an individual's genetics, nervous system and biochemical change that lead to depression.
- (2) Social learning: This includes the family and school factors that can contribute to the occurrence of depression.
- (3) Stress and environmental crises: These are social factors that lead to distress and depression such as, disasters, divorce and death of loved ones.

Beck (1988) introduced two theories of depression. The first theory suggests that social relationship problem is the main cause of depression. Based on this, Beck named the first personality type as socially stereotypical character; while the second personality type is the independent character. These independent people appreciate their freedom, but they become depressed when they cannot accomplish things by themselves, without depending on others.

In his second theory, Beck (1988) attempted to identify whether depressive thoughts are distorted or undistorted, whether they are negative underestimate self. According to Beck et al, (1979), depression activate three main cognitive patterns, which are called cognitive trinity. These cognitive patterns are negative attitudes towards self, the world, and future. These are manifested in four areas:

- (1) Emotional aspects: These comprise depressive mood, and sadness.
- (2) Cognitive aspects: These include low self-esteem and misconception.
- (3) Motivational aspects: These consist of negativism and suicidal tendency.
- (4) Physical aspects: These include loss of appetite, and insomnia.

Williams (2006) ascertains that depression and its accompanying symptoms, such as fatigue impair one's energy and psychological adjustment level. Therefore,

with positive reinforcement, individuals can have their level of psychological adjustment increased. Such a positive support is based on three sources:

- (1) Psychological support: This kind of support is associated with an individual's personal or physical traits and characteristics such as age, level of attractiveness to others, and sense of belonging.
- (2) Environmental support: This occurs as an individual grows and matures in a secured, friendly and democratic family.
- (3) Social and professional support: This kind of support is related to the high social skills an individual acquire and having the kind of profession that helps him psychologically to resist stress and depression.

Moreover, Burns (2000) points out that depression is not an emotional disorder as claimed by psychologists; it is the change in emotion and feeling that results from the distorted attitudes adopted by an individual. Distorted thoughts are always accompanied by depressive sequences or painful emotions. These cognitive distortions include:

- (1) All or nothing: This cognitive distortion is referred to as an individual's tendency to radicalize things, either to get everything or lose everything.
- (2) Overgeneralization: The tendency of an individual to make absolute judgments and extreme generalizations.
- (3) Mental purging: One's focus on the bad aspects in any situation.
- (4) Underestimating positive events: The depressive tendency of an individual to turn positive experiences into negative ones.
- (5) Random conclusion: In many cases of depression, behavior is the result of misinterpretation of an incident.

According to Ellis and Dryden (1987), there are multiple approaches to Cognitive Behavior Therapy (CBT). However, there is a general consensus that for the therapy process to be effective and successful, thought, emotion and behavior cannot be separated because they are all interrelated. Cognitive therapy is a skill-building model, and not a healing model. With it, patients are taught to acquire skills to deal more effectively with their irrational thoughts and behaviors. Beck's cognitive behavioral therapy is a process through which patients' behavior can be modified by influencing their thought processes; it involves knowing how individuals think and how to change their distorted thoughts and negative beliefs (Mustafa, 2000).

Problem of the study and its significance

Beck's theory has much of its theoretical foundations

from the fact that mental and psychological disorders cannot be separated from the way an individual thinks of himself, the world, and his future. Distorted thought is not a symptom of depression; rather it is one of the causes of depression. People have wrong thoughts because they do not know how to think in the right way. Therefore, modifying how a person thinks can help him/her to adjust psychologically (Rude, 2003).

The researcher conducted this study based on his long experience in counseling work. During this work, the researcher noticed that most of the problems of the students are related to their wrong thinking. Students' wrong thinking makes them to have family, collective and adaptive problems and this consequently leads to depression.

The study is significant as it attempts to find solutions to depression using a counseling cognitive-based program, Beck's theory of depression. The study is based on the results of foreign studies, which show the relationship that exists between depression and distorted thoughts. One of such studies is that of Beavers and Millere (2012). More specifically, this study identify the effectiveness of Beck's theory in training students on how to use logical reasoning, knowing the level of depression experienced by the students and improving their level of adjustment. Hypotheses of the study are:

- (1) There are no statistically significant differences in the level of depression reduction of the university students who were counseled, using Beck's theory of depression and those who were not counseled at 5%.
- (2) There are no statistically significant differences in the improvement level of the psychological adjustment of the university students who were counseled, using Beck's theory of depression and those who were not counseled at 5%.

Definition of terms

Depression

It is an emotional state in which an individual suffers from severe grief, delayed response, and pessimistic tendencies. This might lead to suicidal tendency. Depression is categorized into three: depressive sentiment, depressive distortions, and depressive disorder (Ibrahim, 1998). In this study, depression is defined based on the level of an individual in the Beck's Depression Inventory (Hamdi et al., 1988).

Adjustment

This falls within three categories: the first is biological, the second is social, and the third is psychological.

Psychological adjustment is characterized as one's self-esteem and appreciation of one's responsibility (Hamdi et al., 1992).

Counseling program

It is a set of structured cognitive behavioral procedures and exercises used to train individuals to help them reduce their depression level and improve their level of psychological adjustment. In this study, the program is measured by Beck's Depression Inventory.

LITERATURE REVIEW

Kelly and Lahey (1983) identified wrong thinking as a mediator between depression, life stress and psychological adjustment in a sample of 286 university students. Beck Depression Inventory and Life Experience Scale were used in the study. The results of the study indicated there was a statistically significant relationship between wrong thinking and depression, and a statistically significant relationship between the inventory of misconceptions and Beck's Depression Inventory (Amer, 2004).

Ibrahim and Alnafie (1991) determined the percentage of depressive distortions among a sample of Saudi students, using different psychological scales. They concluded that 64% of the students had the tendency to self-reproach, 52% felt helpless; 49% suffered from loss of appetite and 38% had sleep disorders. Similarly, many of the participants had other pathological symptoms including: inability to concentrate (54%), extreme shyness (53%), convulsions (42%), and academic difficulties (33%).

Beavers and Miller (2012) identified the extent to which a cognitive therapy was used to modify the misconceptions and depressive symptoms of individuals who were under a six-month therapeutic program. The results revealed that there was a statistically significant relationship between wrong thoughts and depressive symptoms; misconceptions and depressive symptoms every month for one year. The results of the study showed that wrong thoughts and depression decreased in the participants who received the cognitive therapy but not in those who did not receive the cognitive therapy.

Moreover, Tellier (2013) conducted a study to examine the effectiveness of a cognitive behavioral therapy program in reducing depression in a sample of 62 adolescents divided into (experimental group and control group). The first group was trained to reduce the level of depression, using the Depression Scale, Jones Test for Misconceptions and the Determination of Guilt survey for adolescents. The results of the study indicated that there was a statistically significant reduction in the depression

level of the experimental group who received the training but not the control group.

Larsen (2011) examined the non-adaptive behavior of 82 adolescents through discussion, self-monitoring, cognitive construction, and home assignments. The results showed the effectiveness of the therapeutic program in reducing the non-adaptive behavior of the participants.

Apsche et al. (2010) studied a strategy used in changing one's way of thinking. The program helped them to identify negative thoughts, feelings and misconceptions of the participants of the study. Beck Depression Inventory was applied on a sample of 10 adolescents of 11-18 years, for 16 weeks. The results indicated that the cognitive behavioral therapy was effective in modifying the misconceptions and reducing the level of depression of the adolescents.

METHODOLOGY

Sample of the study

The population of the study consists of 100 students of the Faculty of Educational Sciences, World Islamic Sciences and Education University (WISE). The researcher used Beck's Depression Inventory (BDI) and Psychological Adjustment Scale (PAS) in the study. The students were divided into two groups: experimental group and control group. Since the average score of BDI is 16 to 23, it is considered that the participants who had 25 score and above had a high level of depression. Accordingly, 30 students with the highest scores were selected. The students had 50 and below in the psychological adjustment test.

Experimental group

The experimental group was composed of 15 students, who were counseled using Beck's theory of depression. The researcher met with them once in a week for eight weeks. The program had eight sessions, 90 minute for each.

Control group

The control group consisted of 15 students, who were not counseled. They were placed on the waiting inventory. Table 1 shows the distribution of the population of the study.

Instruments used for the Study

Beck's depression Inventory (BDI)

In this study, the Arabic version of BDI was used (Hamdi et al., 1988). Originally, the inventory consists of 21 items used to measure depression level. The score on each item is 0-3, while the total score on the inventory is between 0 to 63. The borderline between the normal and depression level in the real copy of the inventory is 10. The researcher tested the liability of the inventory, by consulting a group of experts. The experts instructed that the inventory paragraphs should not be modified. To measure the validity of the inventory, Cronbach's Alpha equation was used on a sample of 30 students with a validity value of 0.85. The inventory

was corrected by adding the scores obtained by the individuals on all the scale items, where the total score ranged from 0 to 63. The scale items on the inventory are interpreted as follows:

- (1) Not depressed from 0 to 9.
- (2) Mild depression from 10 to 15.
- (3) Intermediate depression from 16 to 23; and
- (4) Strong depression from 24 to 63.

Psychological adjustment scale

This scale was developed by Jibril (1994). The test consists of 40 scale items used to measure four dimensions:

- (1) Personal dimension
- (2) Emotional dimension
- (3) Family dimension; and
- (4) Social dimension.

The researcher did a reliability test for this study by presenting the scale to ten experts specialized in guidance and counseling. The total score on the scale is calculated by adding all the scores that represent the level of psychological adjustment. The total score of the scale is between 0 to 120 and the researcher extracted the stability of the scale using the equation of Cronbach's Alpha (0.85).

Counseling program

The researcher conducted the counseling in eight sessions; 90 min was used for each session. For each session, the following things were looked into:

- First session: Positive thinking and its relationship with depression and psychological adjustment.
- Second session: Negative thinking and its relationship with depression and psychological adjustment.
- Third session: Types and cause of depression.
- Fourth session: The two ideas of all or nothing and, amplification and reduction.
- Fifth session: The two ideas of overgeneralization and naming.
- Sixth session: The two ideas of charisma and essentials.
- Seventh session: Physical and social problems and their relation with depression.
- Eighth session: Closing session.

Procedures of the study

The study was conducted as follows:

- (1) Defining the population of the study: 100 male students from the Faculty of Educational Sciences in WISE were involved. The sample of the study consisted of 30 students.
- (2) Constructing a counseling program, using Beck's Theory of depression: this consists of eight counseling sessions; each session lasted for 90 minutes.
- (3) Adopting two instruments for the study: Beck's Inventory of Depression and the Psychological Adjustment Scale.
- (4) Applying the counseling program on the experimental group: they got the highest scores in the Beck's Inventory of Depression and the lowest scores in the Psychological Adjustment Scale.

Study design and statistical analysis

This work is a semi-empirical study. Its aim is to identify the use of

Table 1. Distribution of the population of the study sample according to group and pre- and post- scales.

Variable	Beck's depression inventory (BDI)		Adjustment scale	
	Pre-test	Post-test	Pre-test	Post-test
Experimental group	15	15	15	15
Control group	15	15	15	15
Total	30	30	30	30

Table 2. The mean squares and standard deviations for the experimental and control groups in post-test of the depression scale.

Group	Mean	Standard deviation
Experimental	11.010	0.750
Control	13.60	0.750

Beck's Theory counseling program in reducing depression and improving the level of psychological adjustment of the study's participants. One-way Analysis of Covariance (ANCOVA) test was used to identify the effect of the experimental treatment on the experimental group and control group. The variables of the study are as follows:

Independent variable: Counseling program; Dependent variables: Depression and psychological adjustment.

Accordingly, the experimental design is as follows:

The experimental group: pre-test; counseling program –post-test scale;

O1 x O2

Control group: pre-test scale; No treatment - post-test scale;

O1 x O2

FINDINGS

The study aims to identify the effectiveness of counseling using Beck's Theory of depression in reducing the depression level and as well as improving the psychological adjustment level of male students in the Faculty of Educational Sciences World Islamic Sciences and Education University.

Results of the first hypothesis

To examine this hypothesis, mean squares and standard deviations were calculated for both the experimental and control groups. Table 2 shows the modified mean squares and the standard deviations of the depression scale in the post-test. Table 2 shows that the mean of the experimental group in the post-test is 11.010, while that of the control group is 13.60. In order to verify that the

difference between the mean squares was statistically significant, ANCOVA was applied as shown in Table 3. Table 3 shows that the differences between the mean squares of both groups were statistically significant. The differences were in favor of the experimental group. Their level of depression was significantly and statistically reduced.

Results related to the second hypothesis

To test this hypothesis, ANCOVA was applied as shown in Table 4. Table 4 indicates that there are no statistically significant differences between the mean squares of both groups. There was no significant difference in the experimental group, those who were counseled as a level of adjustment was not improved statistically and significantly.

To ensure that the differences between the mean squares of both groups were statistically significant, ANCOVA was applied as shown in Table 5.

Table 5 shows that there are no statistically significant differences between the mean squares of the experimental and control groups. The differences were not in favor of the experimental group, as their level of psychological adjustment on the first dimension (personal) was not considered statistically significant. To ensure that the difference between the mean squares of both groups was statistically significant, ANCOVA was applied as shown in Table 6.

Table 6 indicates that there are no statistically significant differences between the mean squares of the two groups; the differences were not in favor of the experimental group, as their level of psychological adjustment on the second dimension (emotional) was not considered statistically significant. In order to ensure that the difference between the mean squares of both groups was statistically significant, ANCOVA was used as shown in Table 7.

Table 7 indicates that there are no statistically significant differences between the mean squares of both groups. The differences are not in favor of the students of the experimental group, who were counseled as their level of psychological adjustment on the third dimension (family) was not considered statistically significant. In

Table 3. Results of the ANCOVA for the significant differences between the mean squares of the experimental and control groups on the depression scale.

Variance source	Mean squares	Std. deviation	Mean Sq.	P-value	Sig.
Group	52.095	1	52.095	6.181	*0.01
Pre-test	1473.911	1	1473.911	147.883	0.00
Error	227.555	27	8.428	-	-
Total	1798.667	29	-	-	-

Table 4. Results of ANCOVA of significant differences between the mean squares of the experimental group and control group on the adjustment scale (total score).

Variance source	Mean squares	Std. deviation	Mean Sq.	P-value	Sig.
Group	8.043	1	8.043	0.261	0.614
Pre-test	297.961	1	2974.9611	96.546	0.00
Error	831.973	27	30.814	-	-
Total	3999.467	29	-	-	-

P-value: Significant at 5% level.

Table 5. The results of ANCOVA of the significant differences between the mean of the experimental and control groups on the scale of adjustment (the personal first dimension).

Variance source	Mean squares	Std. deviation	Mean Sq.	P-value	Sig.
Group	4.636	1	4.636	0.678	0.418
Pre-test	125.782	1	125.782	18.382	0.00
Error	184.752	27	6.843	-	-
Total	331.367	29	-	-	-

Table 6. Results of the ANCOVA of the significant differences between the mean squares of the two groups on the scale of adjustment (the emotional second dimension).

Variance source	Mean squares	Std. deviation	Mean Sq.	P-value	Sig.
Group	1.577	1	1.577	0.491	0.489
Pre-test	446.411	1	446.411	139.091	0.00
Error	86.656	27	3.209	-	-
Total	542.700	29	-	-	-

Table 7. Results of the ANCOVA of the significant differences between the mean squares of the experimental group and control group on the scale of psychological adjustment (Third dimension: the family).

Variance source	Mean squares	Std. deviation	Mean Sq.	P-value	Sig.
Group	0.026	1	0.026	0.010	0.923
Pre-test	466.447	1	466.447	174.387	0.00
Error	72.219	27	2.675	-	-
Total	543.467	29	-	-	-

order to verify that the difference between the mean squares of both groups was statistically significant,

ANCOVA was used as shown in Table 8.

Table 8 shows that there are no statistically significant

Table 8. Results of the ANCOVA of the significant differences between the mean squares of the two groups on the scale of psychological adjustment (the fourth dimension social).

Variance source	Mean squares	Std. deviation	Mean Sq.	P-value	Sig.
Group	3.314	1	3.314	2.032	0.165
Pre-test	113.706	1	113.706	69.7	0.00
Error	44.027	27	1.631	-	-
Total	173.86	29	-	-	-

differences between the mean squares of the two groups. The differences were not in favor of the students of the experimental group, who were counseled. Their level of adjustment on the fourth dimension was not considered statistically significant.

DISCUSSION

The study explores the effectiveness of a counseling program based on Beck's theory in reducing depression and improving the level of adjustment among male university students in the Faculty of Education, World Islamic Sciences and Education University.

The findings of the study revealed the effectiveness of counseling in reducing the depression level of the experimental group, but not that of the control group. Also the findings of the study showed that the counseling program could not improve the level of psychological adjustment of the experimental group. The analysis of common variance indicated that the differences in the means of the experimental group and control group were statistically significant.

The experimental group population, who went through counseling program, had decreased level of depression in the pre-test and the post-test compared to the control group. This is because the program was centered on modifying the thinking patterns of the students. Also, multiple skills were applied during the sessions of the counseling program. The students were given assignments, and asked to apply what they had learned to real life situations. The counseling program showed how negative thoughts could lead to depression. This finding is in agreement with other studies such as Kelly and Tellier (2013), which indicated a low level of depression in individuals trained to modify their negative thoughts. It also agrees with Tellier (2013), which showed the effectiveness of a cognitive behavioral program in reducing the level of depression of the study's participants.

For the second hypothesis, ANCOVA results revealed that there were no statistically significant differences in the mean squares of the experimental and control groups. This is shown by the mean squares of the pre and post scales of the experimental and control groups. Here there was no improvement in the psychological

adjustment level of the experimental group compared to the control group on the total score of the adjustment scale. This is because the experimental group had negative thought, which manifested in their discussions, and pessimistic view of themselves, the world and their future.

Also, modifying one's thinking reduces depression not psychological adjustment. This indicates that individuals require a longer period of time to modify their wrong ideas. Adjustment is a process whereby an individual accepts a new situation, and then begins to act accordingly. Therefore, this result is not consistent with the results of Apscheatel (2010) study, which indicates a reduction in the level of stress and improvement in adjustment among individuals, who went through a behavioral cognitive counseling program.

As regards the sub-dimensions of the adjustment scale, which include the personal, emotional, family and social dimension, the results of ANCOVA indicated that there were no statistical significant differences between the mean squares of the experimental and control group. This is seen in their mean squares in the pre-test and post-test. This result can be attributed to the fact that it takes time for people to adjust their behavior.

Therefore, for adjustment to take place, the first step is to adjust one's negative ideas and then replace them with positive ones. Then, the next step is to put these ideas to work, applying them to real life situations. The program had eight sessions. However, if a similar program was applied for a year, the results would be statistically significant at the level of Individuals need to be trained to adjust their thinking, so that the process of adjustment can be facilitated.

Based on the previous findings of this study, the researcher recommends the following: group counseling of behavioral and cognitive aspects should be done with parents; individual counseling using behavioral and cognitive methods should also be done to modify people's misconceptions; behavioral and cognitive programs for depression should be designed so that they can be compared.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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Full Length Research Paper

The aims and learning attainments of secondary and high school students attending science festivals: A case study

Gonca KEÇECİ

Department of Science Education, Faculty of Education, Firat University, Elazığ, Turkey.

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This study was conducted to determine the aims and learning attainments of secondary school and high school students participating in science festivals. A case study approach which is one of the qualitative research methods was used in the research. This study was carried out in the science festival held in Elazığ, Turkey. The sampling consists of 39 students; 19 secondary school students and 20 high school students were selected on a voluntary basis from the secondary and high school students who were visitors of science festival. In the study, semi-structured interview form and demographic information form were used as data collection tool. Data were analyzed with content analysis. In this study, the aim of students participating in science festivals was acquiring new information, a sense of curiosity, applying the knowledge they acquire in everyday life, entering science competitions with new projects they develop from fresh ideas, and having an interest in science. Students express their learning attainments as acquiring new information, expanding their perspectives, learning about the uses of technology, using the information in daily life and exhibiting a positive attitude toward knowledge and nature.

Key words: Science festival, secondary school, high school, students, learning attainments.

INTRODUCTION

The concept of "lifelong learning" has gained great importance in the 21st century. Training of scientific literacy students is frequently encountered in contemporary science curricula and constitutes the vision of curriculums. In addition to the education provided at educational institutions, students can also participate in activities are done outside school environments to support the students to be as science literate individuals. In this context, science festival and science fair play an

important role in educating science literate individuals with lifelong learning skills (Bruce and Bruce, 2000). There are some differences between science festivals, science Olympiads and science fairs. Science festivals are increasingly becoming a global phenomenon, including some small, localised events reaching small groups, up to nationwide events reaching many millions (Bultitude et al., 2011). Science festivals are organizations that include fairs, exhibitions, science shows and

E-mail: gkececi@firat.edu.tr, kececi.gonca@gmail.com.

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demonstrations, stage shows, street presentations, workshops, outdoor activities, interviews, etc., to reflect the integrity between science and technology, enabling scientific information to be widely distributed. Science fairs, in which participants share their research results with their friends, teachers, parents, scientists and other people in the society, are generally smaller organizations than science festivals. Although science fairs and science Olympics have different applications, they mostly contain a competition environment. Science fair focuses on a single student's experiment but science Olympiad emphasizes teamwork (Abernathy and Vineyard, 2001).

The science festivals, science Olympiad and science fairs that have taken different forms around the world have the same general aims as follows: they contribute to the creation of creative ideas by arousing scientific curiosity in human beings; allow them to base their everyday events on scientific grounds; contribute to positive developments of the participants' knowledge and scientific studies with various applications.

When the background of non-school learning environments is examined, it is recognized that there are different forms of organizations of countries. First, science exhibitions originated by American Institute of Science and Technology in 1828 exposition were public expositions that award the inventors. American Institute of Science and Technology held the first student science fair in 1928 (Bellipanni and Lilly, 1999). The first of UK science festivals was the annual conference, that was renamed a Festival of Science in the 1980s and is now the British Science Festival, held by the British Association for the Advancement of Science in 1831 (Buckley and Hordijenko, 2011). In Turkey, Scientific and Technological Research Council of Turkey (TUBITAK) and the Ministry of National Education (MNE) promote various projects that can be named as science festivals; 2201-National Primary School Mathematics Olympiad, 2202-2203-National and International Science Olympics, 2204-Secondary School Students Research Projects Competition for the primary and secondary school students, "This is My Work" Project. There are two different programs that have received much demand in recent years, that participation is high and are supported by TUBITAK. 4007-Science Festival Support Program aims to do the following: spread scientific culture and science communication to wider areas of society, to increase interest of the society, encourage children and young people to make a career in all scientific fields, integrate different sections with scientists and transmit scientific knowledge in an amusing environment exhibitions, workshops, lab workshops and preferably interactive applications such as thematic games, competitions, stage shows, demonstrations, interviews. 4006-TUBITAK Science Fairs Call Program aims to give support to the science fairs which provide an environment where 5th - 12th grade students can show the results of researches on the basis of their interests.

When the literature was searched, studies related to science festivals and science fairs were encountered (Grote, 1995; Bunderson and Anderson, 1996; Abernathy and Vineyard 2001; Kankelborg, 2005; Rennie, 2007; Yayla and Uzun, 2008; Bultitude, McDonald and Custead, 2011; Durant, 2013; Mernoff et al, 2017). Extracurricular science activities are encouraged by many researchers. For the findings of the recent studies, both number of organizations named as science festival and the number of participants participating in these organizations increased (Yaşar and Baker, 2003), the participants saw science fairs as fun places and found new things in these fairs (Abernathy and Vineyard, 2001). These projects are aimed to provide students to participate in scientific research process, to support their development in line with their interests and skills, to gain the features of thinking, curiosity and inquiry. Science festivals help participants to carry out experiments at the point of creativity, to develop scientific literacy and to conduct projects (Tortop, 2013a). Science festivals help to increase curiosity about new areas of scientific knowledge (Jensen and Buckley, 2014).

As there are positive effects of the science festivals on the participants, there are also negative effects of science fairs. It is observed that the number of students receiving awards in science fairs is very small compared to the number of students participating in science fairs. This situation causes disappointment in the students and the participants in science fairs have a negative attitude towards "competition" and "equal opportunity" points (Yaşar and Baker, 2003). The competition platform also causes students to feel worried and stressed and increases their anxiety level (Wang and Yang, 2003). According to Hampton and Licona (2006), the science fairs have led to negative experiences that prevent especially border students from enjoying science and achieving science understanding.

When the studies in Turkey on science festivals and fairs are examined, it is realized that the existing studies are mostly about "This is My Work" project (Tortop, 2013a, b, c; Bolat et al., 2014; Tortop, 2014; Özel and Akyol, 2016). The aims of some other studies in Turkey are that; a study examined the attitudes of participants to nature and insects (Tezcan and Gülperçin, 2008), the effect of science fairs on students' attitudes towards chemistry lessons were examined (Şahin, 2012), the effects of science festivals on scientific beliefs and Science Teachers' success were examined (Yavuz et al., 2014), the impacts of a secondary school science exhibition on the students in charge in the exhibition were examined (Şahin and Çelikkanlı, 2014), the effect of science fairs on the 6th grade primary school students' attitude towards the science course was examined (Yıldırım and Şensoy, 2016) and in another study the effects of science fair practices on the attitudes of prospective science teachers towards science teaching and students towards science were examined (Durmaz et

al., 2017).

This study was conducted with the secondary and high school students who were visitors of 4007-Science Festival supported by TUBITAK. The science festival had workshops that addressed groups from pre-school to adult levels and also lab workshops and preferably interactive applications such as thematic games, competitions, stage shows, demonstrations, interviews. This study was carried out with the reason of the limited number of studies of secondary school and high school students in the science festivals. In this study, it is aimed to determine the aims and learning attainments of secondary school and high school students participating in science festivals.

METHODOLOGY

A case study approach which is one of the qualitative research methods was used in the research. A case study is used in cases where an event, a person, or a group is examined (Çepni, 2012). Case studies are generally preferred to pose the questions "how" or "why" and to focus on a contemporary phenomenon within some real-life context (Yin, 2003) According to Baxter and Jack (2008), a case study is an excellent chance to gain insight into a case, and facilitates the researcher to gather data from a variety of sources.

This study was carried out in the science festival held in Elazığ. It is estimated that it welcomed almost 2000 visitors to science festival over the 3 days. Averaging almost 400 secondary and high school students visited the science festival. Purposive sampling, a type of non-random sampling technique, was used in the study (Özen and Gül, 2007; Çepni, 2012). The sampling was selected on a voluntary basis from the secondary and high school students who were visitors of 4007-Science Festival. The study group consists of 39 students, 19 secondary school students and 20 high school students.

Data were gathered through semi-structured interviews using five questions to determine the following: who are influential at the point of participating in science festival, if there was a compelling effect on their participation after they were directed to science festivals, students' purpose of attending science festival, what learning attainment they have achieved in festival and whether there was a relationship between students' participation in science festival and their desire to be appreciated. A group of experts were asked to comment on the reliability of the interview questions. Interviews lasted for approximately 15 to 25 min with each student and recorded on time. Some of the students who participated in the interviews had not attended all the events in the festival yet. A second brief interview was held with these students to find out their learning attainments. In addition to the semi-structured interview form, a demographic information form was used to clarify the characteristics of secondary and high school students involved in the working group, including the sexes of students, class levels, economic status of their families and so on. Qualitative data, obtained from semi-structured interviews were analyzed with content analysis. Content analysis is a method used to classify the data based on identified themes and to determine their frequency and their relationships (Cohen et al., 2007; Yıldırım and Şimşek, 2005).

FINDINGS

This section contains the content analysis of the data obtained from the semi-structured interview form and the

Table 1. Gender frequency table of students.

Gender	f	%
Female	7	17.95
Male	32	82.05

Table 2. Grade levels of students.

School	Grade	f	%
Secondary School	5th Grade	2	5.13
	6th Grade	-	-
	7th Grade	4	10.26
	8th Grade	13	33.33
High School	9th Grade	9	23.08
	10th Grade	6	15.38
	11th Grade	1	2.56
	12th Grade	4	10.26

demographic characteristics of secondary and high school students participating in the science festival held in Elazığ.

The demographic characteristics of secondary and high school students

The demographic characteristics of secondary and high school students participating in the study are as follows. The frequency table for the gender of the students participating in the study is given in Table 1. The genders of the students involved in the study are 82.05% males and 17.05% females. The data of the class levels of the students are shown in Table 2. Table 2 indicates that 33.3% of the students of the study group are in the eighth grade, 23.08% in the ninth grade, 15.38% in the tenth grade, 10.26% in the twelfth grade, 10.26% in the seventh grade, 5.13% in the fifth grade and 2.56% in the eleventh grade students. According to Table 2, the highest participation rate belongs to the 8th grade students with 33.33%. Since the interviews are conducted voluntarily, it can not be said that there is no 6th grade visitor. The data of parents' educational status is shown in Table 3.

Table 3 indicates parents' educational status. When we look at the findings of parents' educational status; 39 students in the study group had a primary school graduation percentage of 36% for mothers and 23% for fathers; the percentage of secondary school graduate parents was found to be 10.3% for mothers, 21% for fathers and 26% for parents with high school graduates, both in mothers and fathers. Percentage of parents with undergraduate and above education is 15.4% for

Table 3. Parents' educational status.

Educational Status	Educational status of mother		Educational status of father	
	f	%	f	%
Primary School	14	35.90	9	23.08
High School	10	25.64	10	25.64
University	4	10.26	9	23.08
Middle School	4	10.26	8	20.51
Literate	3	7.69	1	2.56
Master	2	5.13	2	5.13
Not Literate	2	5.13	-	-

Table 4. The professions of the mother and father.

Professions	Mother		Father	
	f	%	f	%
Housewife	30	76.92	-	-
Civil Servant	4	10.26	12	30.77
Worker	4	10.26	9	23.08
Artisan	-	-	8	20.51
Farmer	-	-	5	12.82
Other	1	2.56	4	10.26
Retired	-	-	1	2.56

Table 5. Monthly income status of the family.

Monthly Income	f	%
0-750 TL	1	2.56
751-1500 TL	14	35.90
1501-2250 TL	8	20.51
2251-3000 TL	10	25.64
3001TL and up	6	15.38

mothers; for fathers is 28.2%. Two students stated that her mothers were not literate. The data on the professions of the mother and father are shown in Table 4.

Table 4 shows the professions of the parents. When the answers given to the question of mother's profession are examined, while the first order takes the option of housewife with the mark of 30 students, there are civil servants and workers options with the indication of the second profession. In the case of the father's profession, the civil servant option took the first place with a rate of 30.8%. Findings related to the monthly incomes of the families are shown in Table 5.

Table 5 indicates that the income status of the 14 students is between 751-1500 TL, while the income status of the 1 student is below 750 TL. Income status of

Table 6. Settlement units of families.

Placement Unit	f	%
Provincial Center	25	64.10
Village	9	23.08
District Center	5	12.82

families is compatible with their professions. Findings of the settlements where the families live are given in Table 6.

Table 6 indicates the settlements of the families. The table shows that 64.1% of the students participating in the science festival live in the province center and 23.1% live in the village. It can be said that the number of students participating in the science festival living in the province center is higher than those living in the villages.

Students' views on science festival

In this section, findings from the semi-structured interview form are given. Content analysis was used to analyze the data obtained as a result of the semi-structured interview form. The frequencies of the obtained data and the percentages of these frequencies were calculated and tabulated. The students were asked who are influential at the point of participating in science days. Findings of the answers to the question are shown in Table 7.

Table 7 shows the people who guide students to attend the science festival. It is shown that most of the students (48.72%) visit the festival by their own volition without any guidance. It is indicated that students visit the science festival respectively by the guidance of their teachers, friends, chance and families. Only one student pointed out that both their family and school teachers guided him. Some of the students' views are given below.

Secondary School Student 6: *"I participated in the science festival because I wanted."*

Secondary School Student 13: *"My science teacher*

Table 7. People who guide students to attend the science festival.

Codes	f	%
Own Will	19	48.72
Teacher	10	25.64
Friend	5	12.82
By Chance	2	5.13
Parents	2	5.13
Family and Teacher	1	2.56

Table 8. Impact on participation of science festival.

Codes	f	%
Own Wish (No Compulsory Request)	39	100.00
Someone Else's Compulsory Request	-	-

guided me to participate in the science festival. He said that the workshops were very interesting."

High School Student 21: *"My best friend would attend the science festival. I came with her."*

High School Student 33: *"I saw the poster of science festival in social media by chance."*

The students were asked if there was any oppressive effect on their participation after they were informed about the science festival. The answers of the students are given in Table 8. Table 8 shows that all of the 39 students who participated in the science festival did willingly; they were not forced forced to participate in the festival anyway. Some of the students' views are given below.

Secondary School Student 3: *"Nobody forced me to join the science festival. I came on my own will."*

High School Student 35: *"I am interested in Science and it is my own will to participate in the science festival."*

There were 21 workshops and various activities in the scope of organized science festival. Even though the workshops addressed different age groups, students who wanted to spend a full festive occasion had chance to watch other workshops they were curious about. It is very important to know the purpose of the students participating in the science festivals in order to determine whether the units that organize the festivals overlap with their aims. Therefore, the students were asked about their purpose of attending science festival. Students' purposes of joining science festival are shown in Table 9. Some students have pointed out more than one purposes; therefore, there are more purpose codes than the number of samples.

Table 9 deals with students' purposes of joining science festival. It is shown that 48.72% of the students

participating in the science festival expressed their intention for acquiring new knowledge, followed by students who expressed their curiosity in science festivals with a rate of 25.64%. The lowest rate is 2.56% of the interest in science, to transfer the acquired knowledge to everyday life, and to enter the scientific competitions with the knowledge gained. Some of the students' views are given below.

High School Student 28: *"My purpose to join the festival is acquiring new knowledge. I hope the workshops are interesting."*

Secondary School Student 17: *"I wonder what experiments and workshops are in the festival."*

Secondary School Student 1: *"When I visited science center I really enjoyed. So, I think it will be funny."*

High School Student 21: *"Because my friend participates in the science festival, I also visit the science festival. I plan to wander."*

Students were asked to determine what learning attainments they have achieved in science festival. The data on the contribution of science festival to the students are shown in Table 10.

Table 10 indicates the learning attainments of students in science festival. Twenty-three of the students who were included in the study group stated that they were getting new knowledge within the scope of the science festival they attended, while seven students said that their perspective of science was expanding thanks to the science festivals. Some students stated that thanks to the science days, they learned about the usage areas of technology, they could use the information they got in daily life, they showed a positive attitude towards knowledge and nature. Examples of secondary school students and high school students' views are as follows.

High School Student 22: *"I have acquired new knowledge that is very interesting."*

Secondary School Student 15: *"I have enjoyed while observing 3D models in Augmented Reality integrated in real time in their actual size. I have learnt much more usage areas of technology."*

Secondary School Student 18: *"Joining the science festival has made me noticed interesting events in the nature. I have got various knowledge. I discovered that science can be fun."*

High School Student 37: *"I wondered what I would observe before joining the science festival. After the workshops I observed my curiosity increased. I began to think where I could use my learning attainments."*

A last question was asked for determining whether there was a relationship between students' participation in science festival and their desire to be appreciated. The views of the students about the effects of community appreciation to join the science festival are given in Table 11. It is shown in Table 11 that in the answers to the

Table 9. Students' purposes of joining science festival.

Codes	f	%
Acquiring New Knowledge	19	48.72
Curiosity	10	25.64
Fun	7	17.95
Personal Development Contributed	6	15.38
Wander	4	10.26
To Learn the Current Developments	3	7.69
Producing an Individual Project by Taking Ideas from Events	2	5.13
Interest to Science	1	2.56
Acquired Knowledge to Daily Life	1	2.56
Entering the Science Competitions with the Knowledge Gained.	1	2.56

Table 10. Contribution of the science festival.

Codes	f	%
Acquiring New Knowledge	23	58.97
Increasing Perspective	7	17.95
Triggering The Sense of Curiosity	5	12.82
Having an Idea About the Events	3	7.69
Interest in Technological Developments	3	7.69
Fun	2	5.13
To Learn the Usage Areas of Technology	1	2.56
Using Acquired Knowledge in Daily Life	1	2.56
Positive Attitude Towards Knowledge and Nature	1	2.56

Table 11. The impact of community appreciation on involving science festivals.

Codes	f	%
There Is Influence	26	66.67
Unstable	12	30.77
No Effect	1	2.56

question "Is participation in the science festivals influential in your appreciation of the society?" 26 students answered, "there was an effect", 12 students were undecided, and 1 student responded "no effect". Some of the students' views are as follows.

High School Student 38: *"Participation in science festivals has the effect of being appreciated in society. When I talk about science, at least I will have an idea and I can say that I go to science festival."*

High School Student 26: *"There is an influence. We will earn new ideas if we enter into scientific competitions with the knowledge that we have here."*

High School Student 24: *"Participation in science festivals*

has no appreciable effect in society, because society gives little importance to Science."

DISCUSSION

In this study, the aims and learning attainments of the secondary and high school students participating in the science festival were determined. When the genders of the participants are examined, it is illustrated that there are much more male students than female students. It would not be right to interpret this situation that female students are less interested in science festivals because of the fact that interviews were done on a voluntary basis. There were participating students from all secondary and high school levels except 6th grade students. There were no volunteer participants in interviews of the study at the sixth grade level. When the educational levels of the parents of the participating students are examined, it is found that the vast majority are not university graduates. This situation represents that the high education levels of the families do not affect the participation in the science festivals. Similarly, the professions and income levels of parents do not affect the number of participants of science festival. Science festival was organized in the city

center, but the students who reside in the village also participated in the science festival, owing to the fact that, the number of participants from the provincial center was higher.

When the data of semi-structured interview form was analyzed, it is found that most of the students participated in the science festival on their own volition. The majority of the other students were directed by their teachers. The participation of the students in the science festivals without guidance led to the idea that their scientific awareness was high. Nevertheless, it was observed that some of the students came to the science festival with their parents. These results show that the interaction of children with their families plays a supporting role at the point of participation in social activities, but it also supports the idea that families are more likely to support schools (Aslan and Arslan Cansever, 2007).

The students were asked if there was any oppressive effect on their participation after they were informed about the science festival. All of the students involved in the study answered that they had voluntarily participated in the science festival. It is promising to notice the students participate in such scientific events not by force but by their own will. In this study, the students participated in science festival with the aim of acquiring new information, with a sense of curiosity to transfer the acquired knowledge to everyday life, to enter the scientific competitions with the knowledge gained and have interests in science. Although there are different practices in different countries, science festival, science fair, science olympiad are generally aimed to provide students to participate scientific research process, to understand and use scientific methods while designing and conducting experiments, to support their development in line with their interests and skills, to gain the features of thinking, curiosity and inquiry (Tortop, 2014). The aims of students' participation in science festivals in this study overlap with the aims of science festivals.

According to the students' answers to the question of what learning attainments they got, the learning attainments of the participant students are; acquiring new knowledge within the scope of the science festival, expanding their perspective, triggering the sense of curiosity, having an idea about the events, interest in technological development, fun, learning the usage areas of technology, having positive attitude towards knowledge and nature. These findings are consistent with the literature. Science fairs, as fun places (Abernathy and Vineyard, 2001; Tortop, 2014), help participants to make experiments at the point of creativity, to develop scientific literacy and to conduct projects (Tortop, 2013a; Jensen and Buckley, 2014). Science fairs promote interest in science (Vazquez, France and Perkins, 1994), promote enthusiasm about science, benefit students about communication and scientific skills (Fisanick, 2010), give students the opportunity to interact with other students

interested in science (Grote, 1995), increase in students' attitude towards science course (Yıldırım and Şensoy, 2016), help the students to think critically (Tortop, 2014). There are negative effects besides positive effects especially in the literature due to the competition environment of science fairs in particular (Wang and Yang, 2003), dishonesty (Tortop, 2013b), apprehension (Fisanick, 2010) and cheating in science fairs (Syer and Shore, 2001). The participant students did not mention a negative effect in this study. It can be because of the differences between science fair and festival and the variety of different activities in the science festival.

Most of the students said that participating in science festival was influential on their appreciation in society. It is thought that students' participation in science festival has great effect to create "science culture" in society. Students create awareness within the society with the information they receive in science festivals and encourage people to know scientific activities by conveying this information to the people in their environment in a clear and understandable way.

CONCLUSION AND RECOMMENDATIONS

The results of this study show that secondary school and high school students participating in the science festival get considerable learning attainments. Given the benefits of science festivals, it is suggested to encourage administrators and teachers to organize science festivals. Science festivals should be supported for the dissemination of science culture and for social consciousness. The students who attended the science festival were guided by themselves and their teachers. Only three of the students were guided by their parents. It is believed that if parents direct their children to science festivals, often held in non-school environment, their participation with their children will contribute to the realization of the aims of science festivals. Before the science festivals and during the science festivities, conferences and seminars should be organized on the role of the families so that the students can get the best from these activities.

When studies on science festivals are being carried out problems such as limited time and the noise generated by the crowd in the environment may be encountered. The interview forms and tests can be applied to the students that participate in science festivals in their schools. Science festivals, which are mostly held in private educational institutions, should also be realized in public schools and the number of science festivals to be organized in all educational institutions in general should be increased. In this context, it is needed to encourage teachers and managers in educational institutions to organize science festivals. Students who participate in the science festivities should be provided with the opportunities to reflect and apply the observations.

CONFLICT OF INTERESTS

The author has not declared any conflict of interests.

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Full Length Research Paper

Self-determined motivation, achievement goals and anxiety of economic and business students in Indonesia

Dorothea Wahyu Ariani

Department of Management, Faculty of Economics, Maranatha Christian University, Bandung, Indonesia.

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Anxiety is a natural thing and can happen to everyone; it is a reaction to the inability to overcome problems or lack of security. However, excessive anxiety can impede one's function in life. Anxiety experienced by students can also hinder them in performing better. Setting goals that are difficult to achieve can cause students to experience anxiety or fear of not being able to achieve them. This study aims to examine the relationship model between several dispositional factors that can affect students' anxiety. The author investigated the relation between self-determined motivation, achievement goals, and anxiety in 365 business students. Specifically, the author investigated the relation between self-determined motivation (intrinsic motivation, extrinsic motivation, and amotivation), mastery goal orientation, performance-goal orientation and students' anxiety. Results of Pearson's correlation showed that students' anxiety was positively associated with performance-goal orientation, extrinsic motivation, and amotivation, but students' anxiety was not associated either with intrinsic motivation or mastery-goal orientation. Intrinsic and extrinsic motivation correlated with each other, but correlation between mastery and performance-goal orientation was not significant. Implementing structural equation modeling (SEM) was used to test the relationship models. The first model used three dimensions of motivation as mediating variables of influence between achievement goals and students' anxiety. The second model used two dimension of achievement orientation as mediating variables of influence between motivation and students' anxiety. It was found that the proposed models have a good fit. Students' anxiety was influenced primarily by extrinsic motivation, amotivation, and performance-goal orientation. Further, discussions on the results of this study are discussed in detail in this article.

Key words: Intrinsic motivation, extrinsic motivation, amotivation, mastery goal orientation, performance goal orientation, students' anxiety.

INTRODUCTION

The interaction of different aspects of motivation with different personal characteristics implies that what

motivates some students does not motivate other students. Different types of motivation will also affect

E-mail: ariani1338@gmail.com, dwariani@gmail.com.

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different outcomes. Intrinsic motivation encourages individuals to focus on learning and mastering task skills, while extrinsic motivation emphasizes demonstrating that individuals have high abilities (Utman, 1997). Recent studies have found no significant negative relationship between intrinsic and extrinsic motivation (Bateman and Crant, 2003; Lepper et al., 2005; Lemos and Verissimo, 2014). This means that students can be motivated either by intrinsic or extrinsic factors.

Students' motivation is a goal-oriented behavior that includes thinking in accordance with internal and external conditions (Ames, 1992). Zimmerman and Martinez-Pons (1986) show different ways for students to manage their motivations, such as setting goals, developing positive beliefs about their ability to achieve and completing academic tasks, and composing rewards and punishments for successes and failures in academic tasks. Some researchers suggest that some students are motivated by orientation in mastery goals, while others are oriented toward performance goals (Ames, 1992; Dweck, 1986; Pintrich et al., 1993).

According to Yerdelen et al. (2014), the relationship between achievement goal orientation and academic motivation is significant. Researchers generally emphasize the relationship between mastery and performance goal orientation, and intrinsic motivation. Rawsthorne and Elliot (1999) found that consistent results regarding mastery and performance goal orientation, and intrinsic motivation relationships were not achieved. Wang et al. (2004) found a significantly positive relationship between intrinsic motivation and mastery goal orientation, and there was no significant relationship between intrinsic motivation and performance goal orientation. Meanwhile, Dysvik and Kuvaas (2012) found that performance goal orientation was positively associated with extrinsic motivation. Cerasoli and Ford (2014) also found that mastery and performance goal orientation would have reciprocal effects on motivation.

The results of Middleton and Midgley (1997) and Skaalvik (1997) found a relationship between achievement goals and anxiety. Meanwhile, McGregor and Elliot (2002) found that performance goal orientation is a positive predictor of anxiety and a desire to escape the exam. This study investigates the relationship between achievement factors, motivational factors and students' anxiety in university students. This relationship is tested by testing the model based on social cognitive theory and achievement goal theory. Based on results of research study in Indonesia, there is no relationship between students' motivation and anxiety (Yanti et al., 2013).

Ferrer-Caja and Weiss (2000) stated that intrinsic motivation produces positive learning outcomes, while extrinsic motivation affects negative learning outcomes. There are two learning outcomes, namely adaptive outcomes or positive learning outcomes and maladaptive outcomes or negative learning outcomes. Good goals,

increased interest or self-efficacy, task values, effort, and persistence are adaptive outcomes. Meanwhile, maladaptive outcomes include negative affect (such as embarrassment), anxiety test, handicapping, cheating, reduced help seeking behavior, and decline in any adaptive outcomes (Hulleman et al., 2010; Pintrich, 2000).

Students can be tied to academic tasks for intrinsic and extrinsic reasons (Harter, 1981; Harter and Jackson, 1992). The use of extrinsic motivation is problematic, while intrinsic motivation is an important factor in learning, both inside and outside school. According to self-determination theory, behavior can be influenced by intrinsic motivation, extrinsic motivation (instrumental motives), and amotivation (Deci and Ryan, 2000, 2008). In general, self-determined motivation is associated with a variety of positive outcomes (Grolnick and Ryan, 1987; Deci et al., 1991). Less self-determined forms of extrinsic motivation are associated with negative outcomes such as depression, negative affect, and physical symptoms.

Intrinsically motivated students tend to have less academic anxiety (Gottfried, 1982; 1985; 1990) and less extrinsic motivation (Gottfried et al., 2005). Amotivation or the absence of motivation can be defined as a condition in which individuals can not perceive the relationship between their behavior and the outcome of that behavior. Individuals will perceive their behavior as out of control. In academic domain, amotivation has been associated with boredom and poor concentration in the class (Vallerand et al., 1993) and perceptions of higher stress in school and learning (Bakker, 2004).

Research on self-determination theory with educational outcomes generally found that extrinsic motivation and amotivation are associated with high school dropout students, while intrinsic motivation is related to commitment, conceptualization, and learning madness (Vansteenkiste et al., 2006).

Intrinsic motivation also predicts lower anxiety (Black and Deci, 2000). Intrinsic and extrinsic motivations are positively associated with adaptive outcomes, whereas amotivation is positively associated with maladaptive outcomes (Vallerand et al., 2008). The results of Harlen and Crick (2003) found that individuals with intrinsic motivation had lower anxiety.

Furthermore, some students emphasize goal orientation of students. Motivated students with external examinations may have performance goals and not mastery goals. This is because students focus on good grade, not on mastering of skills. Various general theories that build the concept of motivation refer to the goal orientation. Previous research has indicated that students with mastery goals are more likely to exhibit learning strategies and have an interest in tasks at school, more likely to feel competent or able to follow the learning process, and have more positive attitudes toward school than students with performance goals (Dweck, 1992; Harlen and Crick, 2003). Evidence suggests that

mastery goals are associated with variables that lead to positive outcomes (Ames, 1992).

Achievement goal orientation is a set of goals that help motivate and define a student's learning achievement or behavior (Ames, 1992; Meece et al., 1988). Achievement goal theory explains how learning processes derive environmental influences, learning contexts, and learners' characteristics, and how these processes result in learning (Ames, 1992; Ames and Archer, 1988; Nichols, 1984; Dweck and Leggett, 1988).

In general, research has identified two differentiated goals with mastery and performance goals (Dweck, 1986; Dweck and Leggett, 1988; Elliot and Dweck, 1988) or mastery and performance goals (Ames and Archer, 1987; 1988; Harackiewicz and Elliot, 1993) or task-involvement and ego-involvement goals (Nicholls, 1984). Mastery and performance goal orientation have different effects on performance, motivation, and affect.

Mastery goals focus on acquisition and development, and performance goals focus on demonstrating competence and outperforming others (Senko et al., 2011). With mastery goals, individuals are oriented toward developing new skills, trying to understand their work, improving their level of competence, or seeking a sense of mastery based on self-referenced standards (Meece et al., 1988). Mastery goals relate to motivation to achieve certain accomplishments, efforts, satisfaction and pride, challenging work, and risk-taking (Ames, 1992). Meanwhile, the core of performance goal is to focus on the ability of self and sense of worth and the ability to prove that the individual is better than the other individual who has little effort but succeeds. Performance goal orientation deals with avoidance of challenging tasks (Dweck and Leggett, 1988; Elliot and Dweck, 1988).

Intrinsic motivation contains the enjoyment and interest in activities for its own sake, and is a form of deep motivation approach. Many achievement and intrinsic motivation experts claim that mastery goals support intrinsic motivation, while performance goals have a negative influence on intrinsic motivation (Elliot and Harackiewicz, 1996).

Mastery goals are promoted by promoting intrinsic motivation by developing perceptions of challenges, supporting task involvement, building enjoyment, and supporting self-determination (Elliot and Harackiewicz, 1996). Intrinsic motivation and mastery goal orientation describe achievement motivation and are stable traits or dispositional constructs (Cerasoli and Ford, 2014). Some researchers found a link between goal orientation and intrinsic motivation (Butler, 1989; Ryan and Deci, 1989).

Performance goals are described as undermining intrinsic motivation by cultivating threat perceptions, disrupting task involvement, and bringing in anxiety and evaluative stress (Elliot and Harackiewicz, 1996). Performance goals are also expressed to generate evaluative pressures and elicit anxiety, as well as generate the antithesis of intrinsic motivation (Harackiewicz et al., 1984).

Mastery goals facilitate intrinsic motivation, while performance goals conflict with their influence on intrinsic motivation. Previous researchers stated that performance goals will further reduce intrinsic motivation compared to performance goals (Dweck, 1986). The influence of performance goals on intrinsic motivation must be manifested only at low perceptions of competence (Butler, 1992). Experts of achievement goals and intrinsic motivation argue that mastery and performance goals produce different processes that have different consequences on intrinsic motivation (Rawsthorne and Elliot, 1999). Research on the effect of goal setting on intrinsic motivation found mixed results (Locke et al., 1981). According to them, mastery goal has a positive influence on intrinsic motivation, while performance goals can generate anxiety and interfere task involvement. McGregor and Elliot (2002) found that mastery goal orientation has a more positive effect on intrinsic motivation than do performance goal orientation.

In other words, performance goal orientation tends to undermine intrinsic motivation. Some theorists argue that mastery goal orientation can encourage intrinsic motivation because mastery goal orientation encourages individuals to seek challenge and persistence in order to improve competence (Butler, 1987).

On the other hand, performance goal orientation can diminish interest because performance goal orientation can exacerbate evaluation and make individuals anxious about their performance or can make individuals perceive their behavior as extrinsically controlled (Nicholls, 1984; Ryan et al., 1991).

Previous researchers have also stated that both mastery and performance goals have the potential to encourage intrinsic motivation (Harackiewicz et al., 1998). Although performance goal orientation is more convincing than mastery goal orientation to encourage extrinsic motivation, the impact of performance goal orientation on extrinsic motivation is inconsistent (Heyman and Dweck, 1992).

Previous researchers stated that the mastery goal orientation and performance goal orientation did not correlate (Ames and Archer, 1988; Miller et al., 1993). Nevertheless, some other researchers say that the two goal orientations are positively correlated (Archer, 1994; Harackiewicz et al., 1997; Meece et al., 1988; Roeser et al., 1996). In other words, mastery goal orientation and performance goal orientation are relatively independent, so some students pursue one of the goals, but some other students can pursue both.

Furthermore, this study uses students' anxiety which is maladaptive behavior as consequences of student motivation. Anxiety testing is a strong emotional reaction experienced by individuals before and during the exam (Akca, 2011). Anxiety is also viewed as a set of phenomenological, psychological, and behavioral responses associated with negative consequences or failure of exam or other evaluative situations (Nature, 2013).

The anxiety primarily occurs when the individual meets the evaluative situation. Anxiety includes fear of being assessed, lack of self-esteem, and having negative outcomes of testing. This study aims to enrich previous findings that intrinsic motivation is positively associated with mastery and performance goal orientation.

Previous studies suggested inconsistencies in the relationship between mastery and performance goal orientation and motivation. This study also examined the relationship between mastery and performance goal orientation with intrinsic and extrinsic motivation, and amotivation. This study examines the relationship between mastery and performance goal orientation, intrinsic and extrinsic motivation, and students' anxiety as maladaptive outcomes. This study also tested the relationship model between the six variables using structural equation modeling. This research uses self-determination theory and achievement goals theory as antecedents from students' anxiety as maladaptive behavior. Based on the theoretical studies and research results, the proposed hypotheses are:

H1a = Mastery-goal orientation is positively related to performance-goal orientation

H1b = Mastery-goal orientation is positively related to intrinsic motivation

H1c = Mastery-goal orientation is positively associated with extrinsic motivation

H1d = Mastery-goal orientation is negatively associated with amotivation

H1e = Mastery-goal orientation is negatively associated with students' anxiety

H2a = Performance-goal orientation is positively related to intrinsic motivation

H2b = Performance-goal orientation is positively related to extrinsic motivation

H2c = Performance-goal orientation is negatively associated with amotivation

H2d = Performance-goal orientation is positively associated with students' anxiety

H3a = Intrinsic motivation is positively associated with extrinsic motivation

H3b = Intrinsic motivation is negatively associated with amotivation

H3c = Intrinsic motivation is negatively associated with students' anxiety

H4a = Extrinsic motivation is negatively associated with amotivation

H4b = Extrinsic motivation is positively associated with students' anxiety

H5 = Amotivation is positively associated with students' anxiety

MATERIALS AND METHODS

Research procedures and samples

This research was conducted in Yogyakarta, using undergraduate

students who are studying economics and business. Yogyakarta is one of the student cities in Indonesia being known to be a creative and culture city. Many entrepreneurs in Yogyakarta are known to be students. As a big city, Yogyakarta still upholds its regional culture. Competition in education in Yogyakarta is also very tight, so students who study in Yogyakarta get considerable challenges.

In addition, there are many students in Yogyakarta who learn while working because their parents can not afford to pay tuition. Because many students come from various places in Indonesia who study in Yogyakarta, Yogyakarta is often referred to as miniature of Indonesia. The selection of the research setting was based on previous research. Previous research stated that students become anxious if there is a challenge, not secure, and want to get an excellence goals. In addition, students' anxiety can be generated either because of problems encountered during college or issues that are not related to lectures.

This study conducted exploratory research as a preliminary study for understanding the characteristics of students used as respondents in this study. Based on the results of exploratory study, anxiety was experienced by many students who have followed the lecture process at least in the second year (fourth semester). This is because students have been getting a lot of tasks and new material in accordance with the field of economics and business studies, and are required to be able to learn independently.

At the end of the second year, students will be assessed for their continued study at the university. When it meets the assessment standards, students are able to continue their studies. However, if they do not meet the assessment standards, students will be asked to resign from the university because they are considered incapable of completing their studies.

Sampling method in this research was non probability sampling. The characteristics of students selected as samples in this study should be representative of population characteristics. Students selected as samples were students who have been studying for 4 semesters. This is because students who have taken the course for 4 semesters get bigger tasks and challenges in the form of individual tasks and must take courses that are more focused on the field of ability and talent.

This study uses individuals as the unit of analysis by setting a minimum number of respondents that can answer many questions as much as five times (Hair et al., 2006). The questionnaire had 37 items. The number of the respondents should be at least 185 people who can answer many questions as much as five times as required by multivariate criteria. However, because this study used factor analysis to test its validity, the number of respondents is at least 300 people (Hair et al., 2006). Data were collected by using a non-probabilistic sampling technique. The criterion for participating in this study is that the students should be in the third year of their study. Within three months, the researchers could collect 365 respondents as research data.

Survey methods with self-assessed questionnaire were used in this study. The questionnaire was distributed to students as respondents of this study. The questionnaires were completed in the classroom when the students completed their lessons for four semesters. Students who were still actively doing undergraduate programs in economics and business for four semesters in Yogyakarta were the sample of this study. The survey was conducted from March to May 2017. The collection of primary data using questionnaires and conducted by researchers is the best survey method (Cooper and Schindler, 2008; Neuman, 2006; Sekaran and Bougie, 2013).

This study used self-assessment methods with anonymity. This was done so that students will fill out questionnaires based on the actual conditions perceived. Within 3 months, a total of 365 students could fill out the 400 questionnaires distributed to them (response rate 91.25%).

Questionnaire filling was done using paper and ballpoint, and was done during school hours on campus.

Measurement

The instruments were designed for the individuals as the unit of analysis. Each of the respondents in this study was asked to complete six measurements, namely intrinsic motivation, extrinsic motivation, amotivation, mastery goal orientation, performance goal orientation, and students' anxiety.

Questionnaires regarding mastery and performance goal orientation were taken and developed by previous researchers (Dull et al., 2015). Intrinsic and extrinsic motivation and amotivation constructs were measured using questionnaires from Herath (2015). The questionnaire was translated into Indonesian and adapted to students' understanding in Yogyakarta.

All items of the questionnaires measured using Likert scale with 5-point were as follows; 1 as strongly disagree and 5 as strongly agree. Test of content validity was done by expert assessment in the field of organizational behavior and education. This research used factor analysis for testing construct validity. Construct validity test was done using varimax rotation with loading factor of at least 0.4, as suggested by Hair et al. (2006). This research also used internal consistency test for testing reliability of the research instrument with Cronbach's alpha criteria. Reliability test was done using Cronbach's alpha, with alpha value of at least 0.6 as suggested by Hair et al. (2006). This research also used correlation analysis for examining the relationship between two constructs.

Correlation analysis was used as the initial test before testing the relationship model with structural equation modeling (SEM) using AMOS software. Model testing was performed with a two-step approach, as suggested by Byrne (2001).

RESULTS

Analysis of validity and reliability

Data collection was conducted from March to May 2017. After data were collected, the researcher checked the completeness of the questionnaire. Complete questionnaires were used to test the validity and reliability of the questionnaires, whereas unfilled questionnaires were discarded.

Factor analysis technique with orthogonal and varimax rotation was used to test the validity of the constructs; extraction factor was determined based on theories. Using the factor loadings criteria of more than 0.4 as suggested by Hair et al. (2006), the items of the questionnaires were stated to meet the requirements of construct validity. Factor loading value was recorded between 0.469 and 0.872. The items that had a factor loading less than 0.4 were not used in subsequent analyses.

Reliability testing was done after the items passed in the test of construct validity. Reliability test was done using internal consistency with Cronbach's alpha values of more than 0.6. Reliability between 0.6 and 0.7 indicates fair reliability, between 0.7 and 0.8 indicates good reliability, while reliability between 0.8 and 0.95 is considered to have very good reliability (Zikmund et al., 2010).

Cronbach's alpha values as the reliability tests measuring instrument in this study resulted in a score of 0.809 for intrinsic motivation, 0.849 for extrinsic

motivation, 0.850 for amotivation, 0.655 for performance goal orientation, and 0.766 for students' anxiety construct. Cronbach's alpha values of all variables used in this study were above 0.6. Reliability test results indicated that the instrument of this research was in the category of good reliability and very good reliability. Results of the validity and reliability test of many items of the questionnaire that are valid and reliable are presented in Table 1.

Descriptive statistics

After validity and reliability test was done, descriptive analysis was performed to analyze the mean and standard deviation of each construct. This was done to see whether or not there were six constructs in this research sample. Correlation between two significant constructs was significant, except for the correlation between extrinsic motivation and mastery-goal orientation and correlation between intrinsic motivation and students' anxiety. Standard deviation, reliability scale, and correlations among all study variables are presented in Table 2.

Based on Table 2, the mean of the three variables was between moderate and high (mean values between 2.112 and 4.200), and the standard deviation was also moderate (standard deviation values between 0.431 and 0.835). In addition, all correlations obtained were not quite strong. Correlation between mastery-goal orientation and performance-goal orientation was not significant ($r = -0.067$, $p > 0.05$) (H1a is not supported). Correlation between mastery-goal orientation and intrinsic motivation was significantly positive ($r = 0.311$, $p < 0.01$) (H1b is supported).

Correlation between mastery-goal orientation and extrinsic motivation was not significant ($r = 0.045$, $p > 0.05$) (H1c is not supported). Correlation between mastery goal-orientation and a motivation was significantly negative ($r = -0.158$, $p < 0.01$) and correlation between mastery goal orientation and students' anxiety was also significantly negative ($r = -0.110$, $p < 0.05$) (H1d and H1e are supported). Meanwhile the correlation between performance-goal orientation and intrinsic motivation was significantly positive ($r = 0.256$, $p < 0.01$) and correlation between performance-goal orientation and extrinsic motivation was also significantly positive ($r = 0.557$, $p < 0.01$) (H2a and H2b are supported).

Furthermore, correlation between performance-goal orientation and a motivation was significantly negative ($r = -0.124$, $p < 0.05$) but correlation between performance-goal orientation and students' anxiety was significantly positive ($r = 0.173$, $p < 0.01$) (H2c and H2d are supported). Correlation between intrinsic motivation and extrinsic motivation was significantly positive ($r = 0.453$, $p < 0.01$), but correlation between intrinsic motivation and a motivation was significantly negative ($r = -0.310$, $p <$

Table 1. Valid and reliable questionnaires, factor loading, and cronbach alpha.

Questionnaires	Mastery-goal orientation	Performance-goal orientation	Intrinsic motivation	Extrinsic motivation	Amotivation	Students' anxiety
Mastery-goal orientation1	0.795	-	-	-	-	-
Mastery-goal orientation 2	0.838	-	-	-	-	-
Mastery-goal orientation 3	0.559	-	-	-	-	-
Mastery-goal orientation 4	0.636	-	-	-	-	-
Performance-goal orientation 1	-	0.699	-	-	-	-
Performance-goal orientation 2	-	0.718	-	-	-	-
Performance-goal orientation 3	-	0.750	-	-	-	-
Performance-goal orientation 4	-	0.638	-	-	-	-
Intrinsic motivation 1	-	-	0.648	-	-	-
Intrinsic motivation 2	-	-	0.653	-	-	-
Intrinsic motivation 3	-	-	0.582	-	-	-
Intrinsic motivation 4	-	-	0.603	-	-	-
Intrinsic motivation 5	-	-	0.561	-	-	-
Intrinsic motivation6	-	-	0.741	-	-	-
Intrinsic motivation 7	-	-	0.679	-	-	-
Intrinsic motivation 8	-	-	0.663	-	-	-
Intrinsic motivation 9	-	-	0.500	-	-	-
Intrinsic motivation10	-	-	0.469	-	-	-
Extrinsic motivation 1	-	-	-	0.667	-	-
Extrinsic motivation 2	-	-	-	0.722	-	-
Extrinsic motivation 3	-	-	-	0.737	-	-
Extrinsic motivation 4	-	-	-	0.726	-	-
Extrinsic motivation 5	-	-	-	0.660	-	-
Extrinsic motivation 6	-	-	-	0.688	-	-
Extrinsic motivation 7	-	-	-	0.617	-	-
Extrinsic motivation 8	-	-	-	0.577	-	-
Extrinsic motivation 9	-	-	-	0.549	-	-
Extrinsic motivation10	-	-	-	0.587	-	-
Amotivation1	-	-	-	-	0.865	-
Amotivation2	-	-	-	-	0.793	-
Amotivation3	-	-	-	-	0.872	-
Amotivation4	-	-	-	-	0.793	-
Students anxiety1	-	-	-	-	-	0.705
Students anxiety2	-	-	-	-	-	0.765
Students anxiety3	-	-	-	-	-	0.665

Table 1. Cont'd.

Students anxiety4	-	-	-	-	-	0.778
Students anxiety5	-	-	-	-	-	0.676
Cronbach Alpha (α)	0.673	0.655	0.809	0.849	0.850	0.766
No. of items	4	4	10	10	4	5

Table 2. Mean, standard deviation, and correlations between research variables.

Variable	Mean	SD	α	1	2	3	4	5	6
Mastery-goal orientation (1)	3.514	0.579	0.803	1.000	-	-	-	-	-
Performance-goal orientation (2)	4.200	0.529	0.828	-0.076	1.000	-	-	-	-
Intrinsic motivation (3)	3.981	0.431	0.886	0.311**	0.256**	1.000	-	-	-
Extrinsic motivation (4)	4.022	0.523	0.808	0.045	0.557**	0.453**	1.000	-	-
Amotivation (5)	2.112	0.835	0.850	-0.158**	-0.124*	-0.310**	-0.191**	1.000	-
Students anxiety (6)	3.079	0.721	0.766	-0.110*	0.173**	0.068	0.139**	0.304**	1.000

Notes: **Correlation is significant at the 0.01 level (2-tailed); *correlation is significant at the 0.05 level (2-tailed).

0.01) (H3a and H3b are supported).

Correlation between intrinsic motivation and students' anxiety was not significant ($r = 0.068$, $p > 0.05$) (H3c is not supported). Correlation between extrinsic motivation and amotivation was significantly negative ($r = -0.191$, $p < 0.01$) (H4a is supported). Correlation between extrinsic motivation and students' anxiety was significantly positive ($r = 0.139$, $p < 0.01$), and correlation between amotivation and students' anxiety was also significantly positive ($r = 0.304$, $p < 0.01$) (H4b and H5 are supported).

Lack of strong correlation between these variables is likely due to the characteristics of the variables in this study. Based on the results of the correlation test in Table 2, students' anxiety is not correlated significantly with intrinsic motivation. Intrinsic motivation is also not significantly correlated with extrinsic motivation, nor does

mastery-goal orientation significantly correlate with performance goal orientation.

Result of testing model

In the first model, it was found that mastery-goal orientation and performance-goal orientation influenced each other significantly and positively in intrinsic and extrinsic motivation, but significantly negative in amotivation.

In other words, students who have a goal to develop competence or task mastery and individuals who focus on achieving competencies relative to others or wishing to demonstrate their ability to others will be motivated both intrinsically and extrinsically. Individuals who have goals in learning or have mastery and performance-goal orientation will be motivated in learning. In other

words, amotivation students will only happen if they have no purpose in learning. This study is consistent with the research of Elliot and Church (1997) who also found that mastery and performance goals are important predictors of intrinsic motivation. In addition, the results of this study also support the results of Rawsthorne and Elliot (1999) who found that performance-goal orientation can reduce intrinsic motivation except for cases in educational institutions.

Meanwhile, the first model also shows that intrinsic motivation does not significantly affect students' anxiety. Students' anxiety is affected significantly positive by extrinsic motivation and amotivation. This is consistent with previous studies suggesting that unmotivated students will result in maladaptive behavior such as students' anxiety (Simons et al., 2000). Conversely, preoccupation with tasks or intrinsically motivated

Table 3. Testing results of motivation as mediating variables model using SEM.

Variable	Standardized regression weights	Critical ratio
Mastery-goal orientation → Intrinsic motivation	0.493**	6.109
Mastery-goal orientation → Extrinsic motivation	0.215**	2.290
Mastery-goal orientation → Amotivation	- 0.314**	- 3.992
Performance-goal orientation → Intrinsic motivation	0.489**	7.127
Performance-goal orientation → Extrinsic motivation	0.991**	8.235
Performance-goal orientation → Amotivation	- 0.239**	- 3.534
Intrinsic Motivation → Students' anxiety	0.108	1.370
Extrinsic Motivation → Students' anxiety	0.270**	3.469
Amotivation → Students' anxiety	0.544**	7.574
GFI = 0.980 df = 5		
AGFI = 0.915		
Chi-square = 21.923		
CFI = 0.949		
RMR = 0.011		
RMSEA = 0.096		

Sources: Primary data, processed.

motivation will lead to more adaptive behavior (Simons et al., 2000).

Individuals who are extrinsically motivated by the desire to get an award or recognition will always experience anxiety. In addition, students who are not motivated will also experience anxiety over a variety of challenging tasks. This first model supports the results of Dweck and Leggett (1988) who found that goal orientation influences motivation or behavioral settings. The results of this Model 1 test are presented in Table 3.

Based on Table 3, it appears that the model is fit with the existing data. This is indicated by the value of goodness-of-fit index (GFI) and comparative fit index (CFI) greater than 0.90 or close to 1 (GFI = 0.980 and CFI = 0.949). The chi-square value required for goodness-of-fit is a low value $\chi^2 = 21.923$). The difference between the value of adjusted goodness-of-fit index (AGFI = 0.915) and the value of GFI that is not too high indicates that the model does not need to be modified anymore because it is fit with the data (GFI-AGFI = 0.065).

The value of root mean square error (RMR = 0.011) shows less than 0.05 indicating a small residual value, and can be interpreted as having good of goodness-of-fit; although the value of root mean square error of approximation (RMSEA = 0.096) is above 0.08 or means the goodness of fit is not good.

Of the three dimensions of self-determination theory, extrinsic motivation and amotivation fully mediate the influence of mastery-goal orientation and performance-goal orientation with students' anxiety. Intrinsic motivation only partially mediates the influence of mastery-goal orientation and performance-goal orientation in students' anxiety. Based on the results of model testing using

SEM, then the relationship model in this study is shown in Figure 1.

Furthermore, based on the results of the second model test, intrinsic motivation has a significantly positive influence on mastery-goal orientation and does not affect performance-goal orientation significantly. However, extrinsic motivation has a significantly positive effect on performance-goal orientation and has a significantly negative effect on mastery-goal orientation.

In this second model, researchers did not examine the effect of amotivation on mastery and performance-goal orientation. This is because the effect of amotivation on mastery-goal orientation is not supported by theories. Testing the relationship model using SEM does not fit the data. Furthermore, the results of the second model test found that students' anxiety was significantly affected positively by performance-goal orientation and amotivation, but not influenced by mastery-goal orientation.

The testing of the second model also showed that motivation or behavioral arrangement affects the goal orientation model. Individuals who are intrinsically motivated will tend to increase their competence in high-mastery-goal orientation and experience low anxiety. Individuals who are unmotivated will tend to experience high anxiety. This is consistent with the results of Lee et al. (2003) research.

Research in this field of education differs in extrinsic motivation. Research using students as respondents found that extrinsic motivation significantly affects positively both in mastery-goal orientation and performance-goal orientation. However, the influence of extrinsic motivation on performance-goal orientation was positive, while in the mastery goal orientation it was

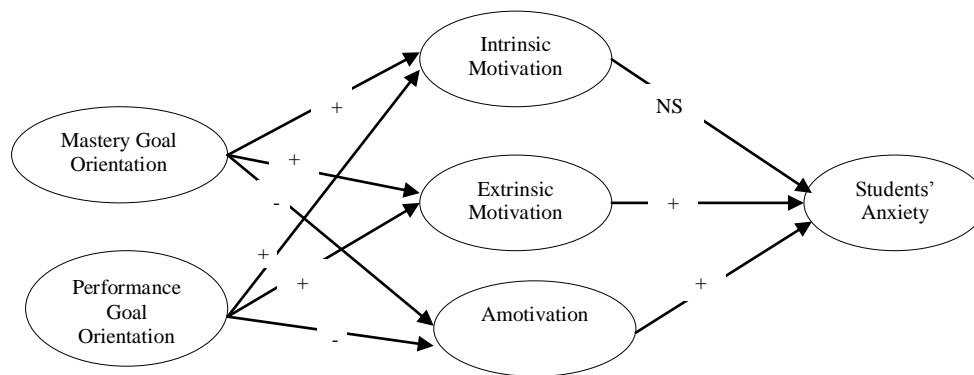


Figure 1. Motivation as mediating variables.

Table 4. Testing results of goal orientation as mediating variables model using SEM.

Variable	Standardized regression weights	Critical ratio
Intrinsic motivation → Mastery-goal orientation	0.489**	5.460
Intrinsic motivation → Performance-goal orientation	- 0.022	- 0.226
Extrinsic motivation → Mastery-goal orientation	- 0.171**	-1.962
Extrinsic motivation → Performance-goal orientation	0.981**	9.916
Mastery-goal orientation → Students' anxiety	- 0.080	- 1.039
Performance-goal orientation → Students' anxiety	0.332**	4.634
Amotivation → Students' anxiety	0.479**	6.028
GFI = 0.984 df = 5		
AGFI = 0.933		
Chi-square = 18.026		
CFI = 0.961	-	-
RMR = 0.007		
RMSEA = 0.085		

Sources: Primary data, processed.

negative. This is different from the results of research in the industrial sector that found that extrinsic motivation only affects performance-goal orientation. The test results of this second model are presented in Table 4.

Based on Table 4, it appears that the model also fits with the existing data. This is indicated by the value of goodness-of-fit index (GFI = 0.984) and comparative fit index (CFI = 0.961) greater than 0.90 or close to 1. The chi-square value required for goodness-of-fit is a low value ($\chi^2 = 18.026$). The difference between the value of adjusted goodness-of-fit index (AGFI = 0.933) and the value of GFI that is not too high; indicates that the model does not need to be modified anymore because it fits with the data (GFI – AGFI = 0.028).

The value of root mean square error (RMR = 0.007) shows less than 0.05 indicate a small residual value and can be interpreted as having good of goodness-of-fit; although the value of root mean square error of approximation (RMSEA = 0.085) is above 0.08 or means the goodness of fit is not good. Of the three dimensions

of self-determination theory, performance-goal orientation fully mediates the influence of extrinsic motivation with students' anxiety. Based on the results of model testing using SEM, then the relationship model in this study is shown in Figure 2.

DISCUSSION

The purpose of this study can explain the relationship between intrinsic motivation, extrinsic motivation, a motivation, mastery-goal orientation, performance-goal orientation, and students' anxiety.

The results of this study showed a significantly positive relationship between intrinsic motivation and both mastery-goal orientation and performance-goal orientation. This is consistent with previous findings that showed intrinsic motivation was positively associated with mastery and performance goal orientation (Harackiewicz et al., 1998). Extrinsic motivation is not significantly

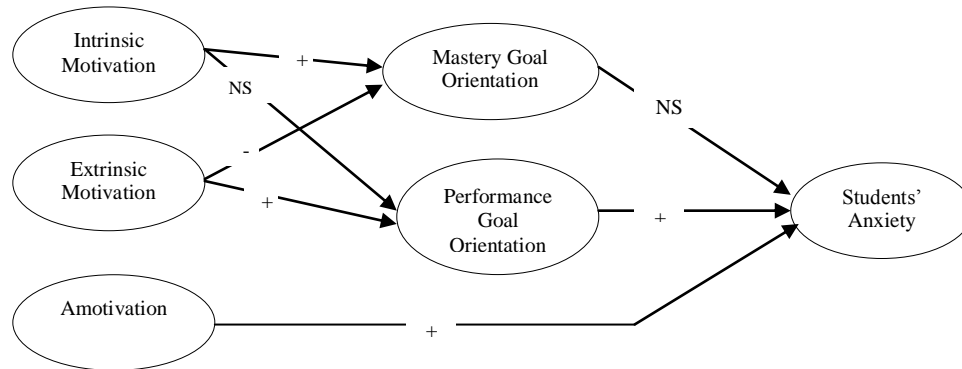


Figure 2. Goal orientation as mediating variables.

correlated with mastery-goal orientation, but is positively related to performance-goal orientation. The results of this study support the previous study (Wang et al., 2004; Dysvik and Kuvaas, 2012).

The results of this study also showed a significantly positive relationship between intrinsic and extrinsic motivation. Positive relationship between intrinsic motivation and extrinsic motivation is only happening in the academic field. This is consistent with the research results of Bateman and Crant (2003), Lepper et al. (2005) and Lemos and Verissimo (2014). Their studies suggesting that there is no significantly negative relationship between intrinsic and extrinsic motivation. This is because students in general not only seek knowledge, but also the pursuit of grade point.

The results also show that mastery-goal orientation does not correlate significantly with performance-goal orientation. This is consistent with previous studies which suggest that mastery and performance goals are not only correlated but also have moderate correlation (Midgley et al., 2001).

The absence of a relationship between mastery-goal orientation and performance-goal orientation indicates that the two constructs are different and independent. In addition, students can have more than one goal in their learning on campus. This supports the results of Rawsthorne and Elliot (1999) research. Rawsthorne and Elliot (1999) found that performance-goal orientation was not correlated with mastery-goal orientation. However, the results of this study differ from those of Cerasoli and Ford (2014) which suggests that mastery-goal orientation is associated significantly and positively with performance-goal orientation.

The results of this study indicate that intrinsic motivation correlates significantly with mastery and performance-goal orientation. This is in contrast with previous research findings that show that performance-goal orientation disturbs intrinsic motivation (Elliot and Harackiewicz, 1996; Harackiewicz et al., 2000).

Intrinsic motivation encourages students to want to understand the material presented in the classroom, and

wants to show their achievement to others. This study uses students' anxiety as a dependent variable. The results of the correlation test showed that students' anxiety correlated significantly and positively with performance-goal orientation, extrinsic motivation, and amotivation, and correlated significantly and negatively with mastery-goal orientation. It did not correlate significantly with intrinsic motivation.

Students' anxiety is caused by their desire to get a good performance, want to show his ability to others, or because the students are not motivated. Students who want to learn because they want to improve their ability have low anxiety, while students who feel comfortable in learning and enjoy the challenges in the learning process will not be anxious.

The result of this study found that amotivation is significantly negative both with mastery-goal orientation and performance-goal orientation and with intrinsic and extrinsic motivation. Amotivation only correlates significantly positive with students' anxiety. Amotivated individuals often experience anxiety over what they experience. In addition, individuals who have no goals in learning will not be motivated in learning.

Furthermore, the results of this study also found that students' anxiety are positively associated with extrinsic motivation and performance goal orientation. This shows that the desire to demonstrate their ability and have grade points will improve students' anxiety, even if the desire is difficult to achieve.

This study also aims to test two relationship models, namely mediating model. In the first model, the three dimensions of motivation are as mediating variables, while in the second model, the two dimensions of goal orientation are as mediating models. In the first model, extrinsic motivation and a motivation fully mediate the influence of mastery and performance goal orientation on students' anxiety.

Meanwhile, intrinsic motivation is partially mediates the influence of mastery and performance goal orientation on students' anxiety. The first model supports the research results of Harackiewicz et al. (1998) which stated that

achievement goals should indeed affect intrinsic motivation because both are important indicators of individuals' success.

In addition, individual behavior is influenced most adaptively by intrinsic motivation (De Freese and Smith, 2013). Students' anxiety is influenced by extrinsic motivation and a motivation. Students who are only motivated extrinsically by grade point or simply want to show their abilities, and a motivated students will have high anxiety. Conversely, students who are intrinsically motivated by interest and challenge will have low anxiety.

In the second model, students' anxiety was positively affected by performance goal orientation and a motivation and was not affected by mastery goal orientation. This second model supports Dykman (1998) research which states that performance oriented individuals will exhibit high anxiety. The second model shows that achievement goals orientation partially mediates the influence of two dimensions of motivation on students' anxiety. A motivation is the strongest variable that influences students' anxiety. This indicates that the student will always be anxious if they have no goals in his learning.

The results of this study indicate that motivation helps to reduce students' anxiety. This can be done by encouraging and rewarding students in learning and taking exams. However, students with high expectation and thinking to achieve perfection will lead students' anxiety. Students' anxiety will increase if they want to satisfy a motivating person, have high expectations, and always think about the results or consequences of the exam that are not in line with their expectations. Therefore, students who are extrinsically motivated are more likely to experience greater anxiety.

The results confirm the findings of previous researchers who found that less self-determined forms of motivation were associated with less adaptive behavior (Knee and Zuckerman, 1998; Knee, Patrick et al., 2002; Amiot et al., 2004; Amiot et al., 2008).

Both models tested in this study indicate fitting with the existing data. This is indicated by the high goodness-of-fit index (GFI) value (GFI > 0.90). In addition, the difference between the GFI, adjusted goodness-of-fit index (AGFI) and comparative fit index (CFI) is small values; this indicates that the model does not need to be modified anymore.

Based on these two models, there is the existence of mutual relationship between intrinsic motivation and mastery-goal orientation and between extrinsic motivation and performance goal orientation. Both models also show that students' anxiety is influenced by extrinsic motivation, performance goal orientation, and amotivation.

Conclusion

Although it is a normal reaction to a particular situation, students' anxiety is an unexpected condition in the

learning process. Based on the results of this study, students' anxiety will occur when students are not motivated, or motivated extrinsically because of the results to be achieved, and if they do not enjoy the learning process.

In addition, students' anxiety is also caused by the goals of students who want to show their ability to others. The educational environment also differs from the business environment where intrinsic motivation and extrinsic motivation of students can run together. Students' anxiety also occurs when students learn only to show their ability to others, not because they want to increase their knowledge.

This study made an important contribution. First, the results of this study explain how motivation greatly affects students' anxiety. Therefore, generating motivation by generating a sense of comfort from the learning process is very important. Secondly, for educators, the results of this study explain how extrinsic motivation, performance goal orientation, and a motivation affect students' anxiety.

Therefore, educators should create an atmosphere that can encourage the emergence of intrinsic motivation and students following the learning process because of mastery goal orientation, their desire to develop their skills, knowledge, and not merely to show off their ability to others.

This research is inseparable from several weaknesses. First, this research uses self-report which causes common method variance. This results in a beta bounce caused by this variance. Secondly, this study uses cross-section data which are actually not appropriate to test the model mediation. Mediation model will be more appropriate when using time series data or longitudinal data.

Further research is expected to continue this research, by examining the effect of external factors such as places, colleague, lecturers, and so forth on student anxiety. In addition, further research is also expected to test the effect of students' anxiety on achievement or performance.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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Full Length Research Paper

Teachers' attitudes towards liquid crystal display (LCD) panel interactive board applications

Eyup İZCİ^{1*} and Volkan DARMAZ²

¹Department of Educational Sciences, Faculty of Education, Inonu University, Malatya, Turkey.

²Department of English Language Teaching, Faculty of Education, Inonu University, Malatya, Turkey.

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This study determined the viewpoints of teachers from different branches on using the interactive boards placed in classrooms in high schools, which are expected to replace the classical boards in the context of FATİH Project by the Ministry of National Education. Single Review Model was used in the present study where 21 teachers participated from different branches of high schools and the installation of interactive boards was completed in Fall Season of 2013 to 2014 Academic Year. The data of the study were collected by using the Liquid Crystal Display (LCD) panel interactive board attitude scale consisting of 10 questions. The data were examined by using descriptive and content analysis methods and the findings were listed and tabulated according to the questions of the scale. When the results were analyzed, it was observed that the teachers who participated in the study made use of the LCD panel interactive boards technologies frequently in their classes for educational activities such as presentation of slides and digital books or showing of films, videos, pictures, etc. Despite some infrastructural problems and lack of software, they stated that the advantages brought by the use of interactive boards in education were more than the drawbacks, and it was adopted by almost all teachers. However, in order to place the use of interactive boards in the desired level for all teachers, more than one in-service training are needed to cover the needs that are determined in the present study.

Key words: FATİH project, interactive board, teacher's attitudes.

INTRODUCTION

The overwhelming developments and innovations in technology, especially in computer and communication technology, have brought noticeable changes in many social lives. One of the areas affected by these innovations and developments is education. This process naturally affects the educational approaches and increases the importance of learning with technology (Demirli, 2002: 4). Besides that, with increase in the

desire for education, increase in the number of students and amount of information, the complicated content of information to be taught, and the growing importance of individual education and similar reasons, the use of computers in education and also Computer Assisted Education (CAE) applications (Odabaşı, 1998: 135) have been initiated.

When the background of technology-supported

*Corresponding author. E-mail: eyup.izci@inonu.edu.tr. Tel: +905354619744.

education is considered, it is seen that it has a long history. Innovative educational regulations were designed in the 1960s after being inspired by new technological developments and by using them. Technological developments were used in many fields from computer-assisted teaching to individual educational systems and to open education medium for the purpose of reducing the limitations of classrooms in educational processes and to adopt the educational materials for individual learning level (Sandberg et al., 2011: 1334).

In the late 1950s, computers were used for management purposes in developed universities like Stanford and Illinois in the United States of America. With the production of computers that have low costs in 1960s and 1970s, projects were developed on educational applications (Odabaşı, 1998: 136). The examples of these projects may be as follows: Apple's Classrooms of Tomorrow (ACOT) in 1980s, Preparing Tomorrow's Teachers to Use Technology (PT3) in the USA in 2000s, the Magellan Project, which aimed that a laptop computer is given to each student in Portugal in 2008, the project in South Korea aiming that school books are loaded into electronic medium (Pamuk et al., 2013: 1800). In Turkey, the application of computer-assisted education in educational institutions was brought to the agenda in 1984 for the first time (Odabaşı, 1998).

Using modern technologies in education is suggested as a solution to the known limitations and problems of traditional education (Demirli, 2002: 1), because traditional educational materials like course books guide students in learning the topics that are listed according to a certain order that consist of interrelated chapters during the educational process (Chen and Hsu, 2008: 153). In this respect, to cope with the difficulties faced in educational field, the traditional approaches are inadequate, and when this situation is considered, it becomes clear that the best approach in the present day is to make use of the opportunities brought by information technologies (Kamacı and Durukan, 2012: 204).

In today's world, it is aimed that an individual is trained in such a way that will enable him/her to reach, collect, present, interpret and produce information. When the first applications in which computers were used for educational purposes and the ones used today are compared, it is clear that there are major differences both in terms of the cost of purchasing computers and the skills to use them (Saran and Seferoğlu, 2010: 252).

As a result of these developments, the FATİH (increasing opportunities and improving technology movement) project was brought to the agenda in 2010 for the first time as the most up-to-date and most developed version of CAE. In this project, computers have been replaced with interactive boards. Al-Faki and Khamis (2014) defined interactive boards as big touchscreens that have the duty of being a computer and projector. Muhanna and Nejem (2013) defined interactive boards as

being more beneficial than computers because unlike computers designed for individual use, interactive boards are suitable for use in crowded classrooms and support active participation. The basic aim of the FATİH Project that was planned to be completed within 5 years after it was initiated, was to ensure equality without considering geographical differences, developing and improving the technology used in schools, and support the learning of students by placing the tools of information technology in the center of learning medium. The project was started by Ministry of National Education (MoNE) and supported by TÜBİTAK, Ministry of Science, Industry and Technology, and Ministry of Transportation, Maritime Affairs and Communication. The project consisted of 5 basic components (MoNE, 2013):

1. Providing the hardware and software infrastructure,
2. Providing and managing the educational e-content,
3. Active ICT use in educational programs,
4. In-service training for teachers and
5. Conscious, reliable, manageable and measurable ICT use.

To understand better why having interactive boards in classrooms is so important, the advantages and disadvantages of this technology should be considered. These advantages and disadvantages can be listed as follows (Brown, 2003; Glover et al., 2007; Karsenti, 2016; Smith et al., 2005):

Advantages

1. The system has a user-friendly interface; it facilitates the spread of information-communication technologies (ICT).
2. Teachers may bring existing ready materials together and prepare presentations because the system is suitable for multiple purpose use.
3. The system facilitates the learning of students, and increases motivation and participation in lesson.
4. Saves students from taking notes and has the flexibility that facilitates the sharing of documents via internet access.
5. The system helps education by considering individual differences.

Disadvantages

1. The system is more expensive than a computer of a usual board.
2. When the surface of the interactive board is damaged, it may be expensive to renew it.
3. It may be difficult to place it to make everybody benefit from it in a comfortable way in classrooms.

4. If remote access is allowed to the interactive board, foreign users may invade the system in an unwanted way.

Nowadays, students are not limited with learning in a fixed place (Sandberget al., 2011: 1334) and the duty of reducing the disadvantages mentioned above and protecting the advantages belongs to teachers who are informed and trained on the use of these technologies. But unfortunately, despite this massive rapid shift from the black/white boards to the IWBs, teachers have been faced with adapting to the use of the highly technological tool in their classes (Alparslan and İçbay, 2017: 1779). For this reason, it is extremely important to provide the technical education and support needed by teachers to use interactive boards (BECTA, 2011; Tatli and Kiliç, 2016; Teck, 2013). It is because although there are many claimed benefits for IWB technology, it is the duty of the teachers to exploit the positive features of IWBs and integrate them into their current teaching methodologies (Gashan and Alshumaimeri, 2015: 176).

In consequence, today, the technology is the reinforcer of education of students with its advantages and disadvantages. With transition to student-centered education from teacher-centered education, the role, activity, attitudes and behaviors of students, and technology has become the focal point of interest to study the effects on education (İşman et al., 2004: 11).

The purpose and importance of the study

The purpose of the present study was to gather the viewpoints of teachers who use interactive smart boards in their classrooms on the technology of the interactive boards; and determine their opinions on the innovations bought by FATİH Project, to see how often and how frequently they use the innovations, and to observe the positive or negative opinions on the use of interactive boards in education/classrooms, and to determine their problems in using interactive boards. Therefore, the present study focused on the attitudes and practices of teachers towards the use of interactive boards. To help the teachers and other stakeholders of FATİH Project advance their uses of the interactive boards, and to make contributions in order to improve/develop the existing technology, interviewees were asked eleven questions which are shown one by one in the findings.

METHODS

Design

The present study was conducted by using the Single Review Model, which is one of the general review models. Review design generally means to define the existing situation about the topic of a

study by taking its photo (Büyüköztürk et al., 2012: 177). In this study, the use of interactive boards, which are provided to schools in the context of FATİH Project, by teachers, and the viewpoints of teachers working in schools of MoNE were investigated in terms of their opinions about this technology.

The population and sampling of the study

The study was conducted in 2014 in Malatya City, Turkey. The study was conducted as interviews that included 21 teachers working at high schools in 7 different colleges where interactive boards were installed completely and the teachers were trained on the use of interactive boards. When defining the study group, the convenient sampling method, which is one of the purposeful sampling method was preferred. According to Yıldırım and Şimşek (2011), this method leads to speed and practicableness in a study, and has relatively lower costs when compared with other methods. The teachers had received training on using interactive boards, and were on active duty in schools where the FATİH project was applied, which were accepted as the basic criteria in selecting the teachers for the study group in the present study. The demographical data of the teachers who were included in the study are given in Table 1.

Data collection tool

The "LCD Panel Interactive Board Attitude scale" (Koçak and Gülcü; 2013), which was found in the literature review was used as the data collection tool in the present study. The reliability and validity studies of the scale were evaluated by three academicians who are specialized in assessment and evaluation, curriculum development and computer. The scale consists of 2 sections, the first one including demographical data of the participants, and the second one including the open-ended questions were prepared to determine the viewpoints of the participants on using interactive boards. The semi-structured interview form is a data collection tool that enables the researcher to find the differences and similarities in the answers of the participants given to the study questions, and make comparisons in the light of the data. Unlike quantitative studies, in quantitative studies, some alternative concepts such as credibility, transferability or conformability are used for validity and reliability (Yıldırım and Şimşek, 2011).

Analysis of the data

The qualitative data that were obtained with the interview form were analyzed by the author of the study by using the content analysis technique, and were used in the study after the qualitative data were digitalized. In the content analysis, similar data were grouped and encoded under certain concepts and themes, and the categories (themes) were found, and the findings defined and interpreted by organizing the codes and themes (Balci, 2011; Büyüköztürk et al., 2012; Yıldırım and Şimşek, 2011). In interpreting the data obtained with the content analysis, generally, frequency and percentage are used (Büyüköztürk et al., 2012: 243). The basic aim in digitalizing the qualitative data such as frequency, percentage etc. is to increase the reliability of these data, to reduce their biasness, and make the data to become suitable to make comparisons between categories (Yıldırım and Şimşek, 2011). In this respect, the findings of the study are shown in numbers and tables.

In addition, specialist viewpoints were received for the categories in the reliability study.

Table 1. Demographical data of the teachers.

Variables		No.	%
Branch	Information Technologies	7	33.33
	English	4	19.04
	Geography	2	9.52
	Turkish Language and Literature	2	9.52
	Other (Philosophy, Mathematics, History, etc.)	6	28.56
Gender	Male	16	76.19
	Female	5	23.81
Educational experience	6-10 years	9	42.85
	11-15 years	4	19.04
	16-20 years	4	19.04
	21 years and above	4	19.04
Age range	26-30 years old	3	14.28
	31-35 years old	7	33.33
	36-40 years old	5	23.80
	41-45 years old	2	9.52
	46 years old and above	4	19.04
Duration of using Interactive Board	I do not use at all	1	4.76
	1-2 hours	6	28.57
	3-5 hours	4	19.04
	6-10 hours	5	23.80
	11 hours and above	5	23.80
Institution	High school	21	100
Total		21	100

FINDINGS

Technological devices used by teachers in their daily lives

The question "What are the technological devices you use in your daily life?" was asked the teachers who participated in the study to learn which technological devices they used in their daily lives. The data on the technological devices used by teachers in their daily lives are given in Table 2.

According to the data obtained, the teachers stated that all of them used computers with or without any other technological device(s) by it in their daily lives. The use of interactive phones, table PCs, and mobile phones follow computers. Two teachers stated that they used computers in their daily lives. Some viewpoints of the teachers on this topic are as follows:

Teacher 16: "I generally use computer and smartphone".

Teacher 7: "Mobile phone and desktop computer have become inevitable for me".

Technological materials used by teachers in their classes

The frequency and percentage values of the answers given by the teachers to the question "What are the technological materials you use in your classes?" are given in Table 3.

It was observed that the teachers used the four elements of "Flash – PDF – Picture - Video" (28.57%); and the third elements of "PDF – Picture - Video" (23.80%). It is also observed that the other participants preferred different combinations of the "Flash – PDF – Picture – Video – Office programs" materials in their classes. Another finding shown in Table 1 is the fact that all participants but 1 teacher use at least two different materials in their classes. It attracts attention that at least

Table 2. The technological devices used by teachers in their daily lives and their distributions.

Variables	No.	%
Computer - Smart Phone	8	23.80
Computer - Smart Phone - Tablet Computer	4	19.04
Computer - Mobile phone	3	14.28
Computer alone	2	9.52
Computer - Mobile phone - Tablet Computer – Media player – Smart TV – Home cinema system	1	4.76
Computer – Smart Phone - Tablet Computer - Media player – Smart TV – Home cinema system	1	4.76
Computer – Smart Phone - Tablet Computer - Smart TV	1	4.76
Computer - Smart Phone - Tablet Computer - USB Memory	1	4.76
Total	21	100

Table 3. The technological materials used by the teachers in their classes and their distribution.

Variables	f	%
Flash – PDF – Picture - Video	6	28.57
PDF – Picture– Video	5	23.80
Flash – Office programs – Picture - Video	2	9.52
Flash - PDF – Picture	2	9.52
Flash – PDF - Video	2	9.52
Office programs – PDF - Video	1	4.76
PDF –Video	1	4.76
Flash – PDF	1	4.76
Office programs (word, excel, powerpoint)	1	4.76

2 of the “Flash – PDF – Picture - Video”, which had a rate of 28.57%, were used in 95.24% of all the combinations. Some of the viewpoints of the teachers on technological materials they use in their classes are as follows:

Teacher 20: “First of all, I use PDF and Paint. Of course, flash is also indispensable”.

Teacher 9: “I use PDF and class teaching videos”.

Teacher 21: “Video, PDF and paint are the most frequently used tool by me”.

Viewpoints of the teachers on LCD panel interactive board technology

The viewpoints of the teachers on the hardware infrastructure of LCD panel interactive board technology were examined with the question “What are your viewpoints on LCD panel Interactive Board technology (architecture)? In Table 4, the frequency and percentage values on this field are given. 11 of the teachers stated completely positive viewpoints on Interactive Smart Board Technology with a rate of 52.38%, 6 of them stated that although they had positive viewpoints, there were

also some missing points with a rate of 28.56%. 4 teachers (19.04%) stated negative viewpoints of this technology.

It was observed that when asked about the hardware infrastructure of the Interactive Board, that is, the FATIH Project, teachers considered this technology as a positive development; however, it was also observed that they had several hesitations about the hardware that constituted the system. Because the screen of the interactive board may be small in crowded classes, and in some well-lit areas, the LCD panel has high brightness, which makes it difficult for students to see it; the weariness in the eyes when used constantly, and similar negative points constitute the bases of these hesitations. Some other negative points are, the breakdown of the operation system, inconsistent software, virus infection and reduction of in-class interaction. Some of the viewpoints of the teachers on the infrastructure of the LCD Panel Interactive Smart Board technology are as follows:

Teacher 10: “It has been included in indispensable elements for a quality education”.

Teacher 17: “New-generation interactive boards are

Table 4. The viewpoints of the teachers on LCD panel interactive board technology.

Variables	f	%
Positive	11	52.38
Negative	4	19.04
Positive but infrastructure missing/inadequate	3	14.28
Positive but technology must be developed	2	9.52
Positive but expensive technology	1	4.76

Table 5. Viewpoints on using LCD panel interactive board in education

Variables	f	%
Visual-Audio enhancement	6	22.22
Saving time	5	18.51
Motivating-Permanent education	4	14.81
Education inadequate	3	11.11
Unnecessary investment	2	7.40
Infrastructure missing	2	7.40
Using it must be compulsory	2	7.40
Other (unhealthy, internet connection, misuse)	3	11.11

perfect in many ways, because the projection devices made the previous technologies dysfunctional.

Teacher 5: "Touchscreen is very good. I think this is a perfect technology."

Teacher 2: "I do not find it as a positive development to apply it without forming an infrastructure system. Aside from this, it facilitates the teaching of the classes..."

The viewpoints of teachers on using LCD panel interactive board in education

The teachers mostly gave positive answers to the question "What are your opinions about using LCD Panel Interactive Board in education?" They stated positive viewpoints especially because interactive boards were visual-audio and ensured saving of time. The frequency and percentage values of the teachers on using LCD Panel Interactive Board in education are given in Table 5.

In light of the data given above, it is possible to claim that the majority of the teachers have positive approaches on the use of LCD Panel Interactive Board in educational field. The positive viewpoints have a total of the visual-audio enhancement, ensuring motivation and permanent education, saving time with continuous internet connection. The negative viewpoints of the teachers are as follows: training on the use of interactive boards is inadequate, there are several missing points in the infrastructure, there are potential health problems, and the interactive boards may be misused. Some

viewpoints of the teachers on the use of Interactive Board in Education:

Teacher 11: "The system is a late but positive Educational tool."

Teacher 1: "I find the system beneficial because it is versatile, the data can be visualized, and it increases the interests of students in classes, and makes it possible to reach information."

Teacher 12: "... The system is a revolution for education; however, the user must have adequate training."

Requirement of LCD panel interactive board

Answers to the question "Would you like to have LCD Panel Interactive Board in your classes for the topics you teach? Why?" are given in Table 6.

90.47% of the teachers replied "Yes" to the question and stated that Interactive Board was necessary. They stated that the reason for this was the fact that the system made them save time and energy. One of the teachers was indecisive, and 1 teacher said "No" (4.76%) because the teachers were inadequate, adequate productivity could not be received from the Interactive Board. Interactive Smart Board had multimedia, that is, it may provide the benefits that might be brought by many different tools alone, provide unlimited material in terms of e-content with internet connection, saves time and energy from the self-energy of the teacher, which makes

Table 6. Viewpoints on the necessity of LCD panel interactive board.

Variables	n	%
Yes	19	90.47
Sometimes	1	4.76
No	1	4.76
Total	21	100

Table 7. Viewpoints on the requirement of traditional board.

Variables	No.	%
Yes	14	66.66
Sometimes	5	23.80
No	2	9.52
TOTAL	21	100

this technology attractive for education. Some viewpoints are as follows:

Teacher 7: "Of course, I want. The more these address as many sensory organs as possible, the better the topic is learnt by the student".

Teacher 6: "Of course, I want. Because I am a person who loves videos, presentations and paint".

Teacher 2: "I do not want. Because the teacher does not know how to use it, the desired productivity cannot be achieved".

The necessity for using traditional board

"Would you like to have a traditional board accompanied by an LCD Panel Interactive Board in your classes? Why?" the sixth question and the viewpoints of the participants on having traditional boards as well as LCD Panel Interactive Board in their classrooms are given in Table 7.

14 of the teachers (66.66%) stated that they needed traditional board, 5 of them (23.80%) stated that they sometimes need it, the remaining 2 (9.52%) stated that they do not need traditional boards any more. Majority of the teachers who replied "Yes" said that they preferred traditional boards because they could write without any trouble and could do many things on the traditional board they otherwise could not perform on interactive board. Although, the teachers who replied "sometimes" shared the same justifications with those who replied "Yes", they stated that they did not consider classical writing board as a requirement. Some of the viewpoints of the teachers are as follows:

Teacher 17: "I think that traditional boards should also

Table 8. Intensity of using LCD panel interactive board during classes.

Variables	Frequency	%
Every stage of the class	16	57.14
At the end of the class	5	17.85
In the beginning of the class	4	14.28
In the middle of the class	3	10.71

exist, because interactive boards and their erasers are not adequate for some processes."

LCD panel interactive board use intensity during classes

The answers given by the participants to the question "At which stage do you use LCD Panel Interactive Board during teaching in your classes (in the beginning, in the middle, at the end, continuously, etc.) and why?" are given in Table 8.

It was determined that majority of the teachers (57.14%) used Interactive Boards at every stage from the beginning of the classes until the end. 17.85% of the teachers stated that they used Interactive Boards at the end of their classes for the purpose of solving question related to the topic or to summarize the topic of their classes. A very slight difference was detected between the teachers who stated that they used the Interactive Boards at the beginning of the classes (14.28%) or in the middle (10.71%). The teachers gave their viewpoints on this topic as follows:

Teacher 14: "I always use the Interactive Boards because I need to zoom or shrink the images during classes, or underline important concepts and use maps sometimes."

Teacher 21: "The Interactive Boards is always on and I use it when I need it to show the pictures and shapes in the topic of the class".

Teacher 18: "I generally use it in the middle of the class. Nothing can replace interactive communication".

The purpose of using LCD panel interactive board

The distribution of the data given to the question "For what purposes do you use the LCD Panel Interactive Board in your classes?" are given in Table 9.

Teachers were asked a question on part of the teaching content they preferred using the Interactive Boards, and the rate of the teachers who stated that they used the Interactive Boards when "they were teaching" is 35.29%. Moreover, 33.33% of the teachers stated that they used the Interactive Boards when they were solving

Table 9. The purpose of using LCD panel interactive board

Variables	f	%
Teaching the topic	18	35.29
Solving questions	17	33.33
During Activities	10	19.60
Assigning homework/solving	4	7.84
During Applications	2	3.92

Table 10. Positive viewpoints on LCD panel interactive board

Variables	f	%
Using time efficiently	13	26
Visual-audio	13	26
Attention-motivation-interest	7	14
Technological properties	5	10
All-in-one property	4	8
Permanency in education	4	8
Energy saving	4	8

problems. Ready-made documents which enable teachers save time in which they write the questions were the main preference for teacher to use the Interactive Boards. 19.60 of the participants stated that the reason for their preference was conducting activities. 7.84% of the teachers stated that they preferred the Interactive Boards when they assigning homework or receiving feedbacks about homework. The percentage of teachers who stated that they used the Interactive Boards for activities as the last item was 3.92%. Some of the viewpoints of the teachers on this topic are as follows:

Teacher 8: "I mostly use the system in activity part of the class because I think nothing can replace the teaching of a teacher".

Teacher 19: "I use the system in teaching the topic and solving problems".

Positive and negative sides of interactive boards in the viewpoints of the teachers

The answers given by the teachers to the questions 9 and 10 which are "What are the positive/negative sides of the Interactive Boards they experienced during their classes?" are given in Tables 10 and 11.

The properties (positive attributes) of the LCD Panel Interactive Board were mentioned in the first rank with 26% by stating "using them with more efficiency" and "visual-audio". The viewpoints of teachers that the Interactive Boards increase the motivation, interest and attention in classes for the students were determined as

14% in the second row. The viewpoints of the teachers who considered the Technological properties of Interactive Boards as a positive side were in the third row with 10%. In addition, characteristics of many devices being collected in one single device, the increase in permanency of learning, and saving energy for teachers are among other positive viewpoints of the teachers on Interactive Board. The most positive side of Interactive Boards is that it contributes to the productive use of their times for teachers and include visual-audio enhancement in their classes. Some of the viewpoints of the teachers are as follows:

Teacher 20: "Saving time, I do not expend my energy, ... The system does the job of more than one devices alone."

Teacher 13: "The visuality increases, it saves time."

Teacher 10: "Touch-able technology, fast access to information with internet, flash memory disk may be used simultaneously with USB connection".

The teachers stated that the most important negation about the system was virus infection with a rate of 25.71%, disconnected internet, requiring format, etc. technological problems. Following these problems, the teachers stated that the system reduced the in-class interaction between the teacher-student and student-student, and the new technology makes the eye become weary and has radiation problems with a 14.28%, which is shared by the two teachers who shared these viewpoints. Some teachers stated that this technology was expensive for our country, it was difficult to find materials on their branches, students misused the interactive board and played games and listened to music with a rate of 8.57%. Another viewpoint with 8.57% is the one claiming that the Interactive Board does not have any negative side. The screen is small in some classrooms and cannot be seen by students and writing on touchscreen is not so easy and functional with other negative sides of the new technology stated by the teachers. Some teachers also considered the LCD panels as a threat to health. Some viewpoints of the teachers on the negative sides of Interactive Boards are as follows:

Teacher 8: "Misuse, students watch only movies... In addition, it has many missing points as touch-able screen, I mean the sensitivity is inadequate".

Teacher 9: "The dominance on the classroom reduces when dealing with the board. Viruses are infected and the process of the classes is disrupted".

The properties of LCD panel interactive boards that are used more frequently

The list of the properties preferred with the highest

Table 11. Negative viewpoints on LCD panel interactive board.

Variables	f	%
Technological problems (virus, disconnection etc.)	9	25.71
Reducing in-class interaction	5	14.28
Unhealthy	5	14.28
Expensive	3	8.57
Lacking of course material	3	8.57
Misuse	3	8.57
No negative sides	3	8.57
Screen size	2	5.71
Not suitable for writing	2	5.71

Table 12. The most frequently used interactive board properties.

Variables	No.	\bar{X}
Presentation	1	7.29
Film-video show	2	6.38
Picture show	3	6.14
Course book	4	5.95
Student's book	5	4.95
Writing	6	4.52
Internet connection	7	3.76
Drawing	8	3.62
Saving the notes on the board	9	2.38

frequency by the teachers when using LCD panel Interactive Board is given in Table 12. As shown in Table 12, 7.29% of the teachers stated that they used primarily, the "Presentation" property. Among the most frequently used properties, "film-video show" (6.38%) is the second and "picture show" (6.14%) is the third. Course book (5.95%), student's book (4.95%) and writing (4.52%) are the other most used properties of the interactive boards. Internet connection (3.76%) and drawing (3.62%) are the least ones used for educational purposes by teachers in their classes.

RESULTS AND DISCUSSION

The percentage of use of computer technology (100%) and interactive phone technology (85.72%) was close to each other. This finding shows parallelism with the results reported by Koçak and Gülcü (2013) and is important because teachers who have adopted computer and touchscreen technologies in their daily lives are ready to use this technology both in mental and in physical terms. Tatli and Kiliç (2016) also reported that more computer use increases the use of interactive boards more effectively. This is also supported (question 4) by the teachers' positive attitudes towards using interactive

boards in educational settings (80.96%) over negative attitudes (19.04%). Again, these findings show that the more the teachers interact with the ICT devices, the more positive their overall satisfaction on interactive boards.

On the other hand, with regards to the negative effect of interactive boards, technical problems (25.71%) are a big challenge to teachers as stated in the studies of Koçak and Gülcü (2013), Kurt et al. (2013), Pamuk et al. (2013) and Karsenti (2016) which are important in that they show the seriousness of the situation. The problems that arise due to lack of infrastructural services and technical ones are revealed as the other negative sides of the Interactive Boards and the FATİH Project. These findings show similarities with the study conducted by Erduran and Tataroğlu (2009). In addition, software problems and missing documents were also given as negative effect of the interactive Board in education by Gürsül and Tozmaz (2010), Koçak and Gülcü (2013), Kurt et al. (2013) and Türel (2012). In order to solve these negative points, the teachers recommended that more in-service trainings should be provided for teachers, and it might be compulsory to use interactive boards in classes for a period of time. Teachers who claim interactive boards are unhealthy (14.28%) and reduce in-class interaction (14.28%) should be informed by the

experts of that domain. Otherwise, negative opinions and drawbacks may affect the positive interaction of people with this technology.

Although, some negative opinions are shown for the interactive boards when the stage and purpose of using the interactive boards by teachers were analyzed, it was observed that majority of the participants used the Interactive Boards at every stage from the beginning to the end of their classes; however, it was also observed that this continuous use was not at the same intensity during classes, and increased when the topic is being taught (35.29%) and problems are solved (33.33%). This situation may be explained with the excessive presence of e-content like class teaching videos and ready-to-use question pools on the internet. Videos are more enhanced in terms of audio-visual when compared with plain teaching, and the time spent in writing the questions on the boards is saved because ready-to-use documents reflected on the screen are among the reasons the Interactive Boards are preferred; and also, it must not be ignored that teachers are in constant struggle to solve more questions with students who are studying for national exams, which makes Interactive Boards to be used with such an intensity. The reason why the Interactive Boards are preferred less in homework and practice part is that these processes are performed with oral communication rather than written. In studies by Erduran and Tataroğlu (2009), Gürsül and Tozmaz (2010) and Kurt et al. (2013), it was also reported that the Interactive Boards were preferred more in teaching class topics and in solving questions. Thus, the basic reason for using the Interactive Boards especially towards the end of classes (17.85%), which are in fact used at every stage (57.14%), may be that the teachers' use the Interactive Boards for solving questions as mentioned earlier.

Independently of class stages, the findings also show that Interactive Board "makes classes to be visualized" and "enhance the use of multimedia contents and tools" which supports the findings of Slay et al, (2008). Using time efficiently, increasing student motivation, making classes become more attractive, and providing rich content for the topics of classes are other positive sides of Interactive Board (Altınçelik, 2009; Çoklar and Tercan, 2014; Erduran and Tataroğlu, 2009; Gürsül and Tozmaz, 2010; İşman et al., 2012; Koçak and Gülcü, 2013, Kurt et al., 2013; Sadi et al., 2008).

Besides the advantages above, what make interactive boards more comfortable for teachers are, of course, e-materials such as slides, videos, animations, books, etc. The analysis of the findings indicated that doing slideshow (7.29%), film-video (6.38%) and pictures (6.14%) are the most frequently preferred properties of interactive boards. The basic reason for this situation is that the materials exist for almost all branches. In addition, the teachers who stated that they used the

Interactive Boards for teaching their classes to prioritize these materials confirmed this already expected situation. Similarly, internet connection, drawing, and saving the notes on the board at the last row may be explained with the incomplete infrastructural services. The findings of the study are parallel to the findings of Erduran and Tataroğlu (2009), Koçak and Gülcü (2013) and Kurt et al. (2013), but contrary to the findings of Altınçelik (2009) claiming that "the most frequently used property is writing", and the finding of Koçak and Gülcü (2013) claiming that "the least 3 used properties are showing pictures, internet connection and writing".

Overall, the findings of this study show that teachers think Interactive Boards are very useful and necessary; however, traditional boards should also be included in classes. The basic need for the traditional writing board is the fact that unlike the touchscreen that does not have adequate sensitivity, it is easier to write on traditional green or white boards. Some technological and infrastructural problems may also be considered as other factors that drive teachers to the traditional board.

After all, it is clear that, although teachers have some anxieties and problems, majority of the teachers consider the use of touchable Interactive Boards in a positive way, and use them frequently in their classes. Hence, they need technological support to take advantages of this utmost technology in educational setting.

RECOMMENDATIONS

Based on the findings of this study, to make use of Interactive Board in Educational settings in a more efficient and productive way, the followings are recommended:

1. In order to take the Interactive Boards to the desired level for all teachers, more than one in-service trainings must be organized in the light of the needs determined in the study.
2. It is necessary that a computer teacher is assigned to help the teachers in order to solve the technical or technological problems in every school.
3. The contents of the EBA website (Educational Information Network) which provides materials for teachers who are in need must be increased in a fast manner, and a user-friendly interface must be provided.
4. The results obtained in the present study may be supported with future studies.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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