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Multimedia use in career counseling: Is it useful?*

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Abstract

This study aims to design multimedia materials to be used in career counseling and to test their effects on self-efficacy and learning. Multimedia Learning Theory and Cognitive Load Theory were used in the study as a theoretical framework. The students were provided to recognize their personality traits (interests and abilities) and almost 50 professions in the light of Holland's Theory. 68 eighth graders (34 experimental, 34 control) took part in the study. A statistically significant increase in the career decision-making self-efficacy scores was found for the students in the experimental group who received multimedia training. The material evaluation form revealed that the students in the experimental group found the material useful and effective. The learning test results suggested that the content presented in the materials was learned well. Based on these results; the video materials that allow individuals to get to know themselves and their professions more closely can be used as an effective way in the career counseling process.

1. Introduction

We lead our lives in accordance with the decisions and the choices we make. While some of them are simple and insignificant decisions in our daily lives, some have great impacts (Gati & Asher, 2005). One of the decisions playing a key role in achieving many objectives and of vital importance is career choice (Okutan & Akbas, 2019; Yaylacı, 2007). An individual's ability to maintain a meaningful life and find a place in the community mostly depends on his/her profession. The criteria of an individual in determining social status is the profession (Yeşilyaprak, 2016). Furthermore, the profession is a major element shaping an individual's identity and navigating his/her social relations. (Okutan & Akbas, 2019).

The concept of a profession is initially introduced into our lives with the famous question of "What would you like to be when you grow up?" (Okutan & Akbas, 2019). In the following years, this question will be replaced by "What do you do?" (Yeşilyaprak, 2016). In between these two questions, to assist individuals in the career selection process, the career counseling services were launched (Kuzgun, 2002). The career counseling services that were carried out in an unsystematic manner in the United States started to take a systematic and orderly direction when Parsons founded the first vocational bureau in 1908. In this bureau, Parsons tried to match the individual with the most appropriate profession by examining the characteristics

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of the individual and the profession. This initiative of Parsons paved the way for vocational career counseling services to become widespread.

Considering the first place where the guidance and counseling services are maintained in an organized manner is the primary school (Raven, 2006), it can be seen how important it is to take early steps in the career selection stage. The idea that individuals should receive career counseling education starting from the primary school becomes more and more common (Yaylacı, 2007). According to Bozgeyikli (2005), the career counseling services to be provided in primary school should help students to be aware of their interests and abilities. The career choice of an individual having this awareness beginning from secondary school will be based on the received information as well. More importantly, the person with the increased information about himself/herself and the environment will act more realistically in the career choice (Kuzgun, 2006). Thus, it should be emphasized that the informing process about the individual and his/her surroundings should be performed as early as possible and the importance of the informing process itself is also pointed out.

One of the most important factors affecting career decision-making and determining satisfaction with the workplace is personality (Gökdeniz & Merdan, 2011; Bayram et al., 2012). What separates an individual from others in terms of feelings, emotions, and behaviors and what is consistent amongst the characteristics of an individual can be defined as personality (Taymur & Türkçapar, 2012). The characteristics of an individual and a profession should be in harmony. Otherwise, it is no use mentioning the satisfaction and happiness of an individual with the job (Gökdeniz & Merdan, 2011). Moreover, a high level of fit between the individual and the characteristics of the profession has a positive effect on the individual's professional development (O'Brien et al., 2000). Considering the fact that the majority of human life is spent at work (Bayram et al., 2012), the importance of the personality and working in a job compatible with the personality reveals itself once again.

Holland's Theory emerged in 1959 and emphasizes that the personality has a great place in career decision-making, success, and satisfaction; the individual and the environment where he/she works should be in harmony (Sheldon et al., 2019). This theory and the instruments developed under the light of this theory (self-directed search etc.) are used widely in the field of career counseling and they guide individuals on what career path they should take. According to this theory, there are six types of personalities (Realistic, Investigative, Artistic, Social, Enterprising, and Conventional) and six work environments with the same titles. Individuals should work in a work environment that fits their personalities (Gottfredson & Richards Jr., 1999; Nauta, 2010).

Another factor leading to career indecisiveness or affecting an individual's career choice is career decision-making self-efficacy (CDMSE) (Bozgeyikli, 2005). This concept put forth by Hackett and Betz in 1981 can be defined as the individuals' belief in their ability to successfully complete the tasks of career decision-making. (Öztemel, 2012). Self-efficacy is regarded as an important concept in understanding the individual's career development (Betz et al., 2005) affects their career preferences (Öztemel, 2012). Therefore, the concept of career decision-making self-efficacy has been discussed in many kinds of research on career decision-making (Betz et al., 2005; Chung, 2002). Taylor and Betz (1983) found a strong negative relationship between career indecisiveness and career decision-making self-efficacy. In other words, the higher the individuals' career decision-making self-efficacy is, the lower their career indecisiveness will be and vice versa. Thus, the information about their careers should be provided to improve the student's career decision-making self-efficacy and to minimize career indecisiveness (Salimah et al., 2019).

This study aims to teach the individuals Holland's Theory by using information and communication technologies to improve their career decision-making self-efficacy. There are multiple reasons for choosing Holland's Theory as a part of this study. In the scope of this theory, addressing and assessing individual-profession compliance is quite an easy job (Gottfredson & Richards Jr., 1999). Another reason is its ease of use and its experimental and testable nature (Nauta, 2010). Furthermore, this theory is more preferable

compared to the alternatives due to its easy-to-understand nature that is related to its plainness and simplicity, its practical nature, and as it is sufficient in defining and estimating the relationship between the individual and the profession (Rayman & Atanasoff, 1999). From this point of view; it has been resolved that the theory that can define both the characteristics of the individual (interests and abilities) and the profession; and the harmony between them seems to be Holland's Theory. Additionally, the reason why we aimed to improve the individuals' career decision-making self-efficacy is that this concept has a strong relationship with career indecisiveness. The reason why we used ICT is its advantages that bring to career counseling services. Some of the advantages of ICT are as follows. (Herman, 2010; Kettunen & Sampson, 2019; Salimah et al., 2019; Sampson et al., 2020):

- Offers more information and alternatives for students.
- Reduces costs and increases the possibility of access.
- Facilitates sharing and distributing information.
- Improves and contributes to career planning.
- It helps students determine career choices.
- Offers a learning environment where interaction is increased for students.
- Provides an opportunity for use in personal computers and mobile devices.
- Increases access to rich resources such as video-based and media sources.

One of the methods to present information through ICT is multimedia. It is possible to see the use of multimedia in numerous fields of education. Findings obtained from the multimedia-based research show that learning with multimedia has much more advantages compared to traditional methods. Some of them can be summarized as follows (Abtahi, 2012; Akkoyunlu & Yılmaz, 2005; Baharudin et al., 2019; Cizrelioğulları & Babayiğit, 2019; Mayer, 1997; Rachmadtulla et al., 2019; Salimah et al., 2019; So et al., 2019; Susanto & Rachmadtullah, 2019; Velmurugan, 2019):

- ✓ Develops problem-solving skills of students.
- ✓ Provides the ability to embody abstract concepts.
- ✓ Facilitates understanding and learning of the concepts.
- ✓ It is a student-centered and innovative learning approach.
- ✓ Makes the learning and teaching process more entertaining.
- ✓ Provides students the opportunity to learn independently and at their own pace.
- ✓ Encourages the use of the internet and technology in a positive way.
- ✓ Increases the durability and memorability of the previously-learned subjects.
- ✓ Increases the motivation and students' interest in the study.
- ✓ Allows the realization of more effective and efficient learning.
- ✓ Helps students interact with the learning materials.
- ✓ Makes teaching material reusable and appealing.
- ✓ Encourages active participation and allows students to interact with each other.

Akkoyunlu and Yılmaz (2005) summarize the reasons for achieving successful outcomes in multimedia learning as follows: Proximity to real life, memorability, noticeability, and flexible learning environments.

Information presented with both visual and auditory multimedia materials is addressed to multiple senses. Besides, multimedia makes the subjects learned more appealing and also increases memorability.

Although multimedia use was proved to contribute to the learning process, there are not many studies found in the literature devoted to its use in career counseling. Salimah et al. (2019) designed an Android-based interactive multimedia tool to help students determine their career choice. It was concluded that the career information services can be delivered through interactive multimedia usage and multimedia helped students improve their decision-making ability.

Due to the aforementioned advantages in learning, we have designed a multimedia tool that would allow individuals to choose the right career that fits their personality best. As seen in Figure 1, through the use of multimedia, students can be informed about their personality and professions that fit their personality. If people learn about their personalities and professions, their career decision-making self-efficacy may increase. Then, they may make realistic career decisions, which may, in turn, choose a career in the future that fits their characteristics.

Fig. 1. Directing to the right career choice with the use of multimedia.

1.1. Theoretical Frameworks

The multimedia materials we have developed have been built upon the Multimedia Learning Theory (MLT) and the Cognitive Load Theory (CLT).

1.1.1. Multimedia Learning Theory (MLT)

According to MLT, the words and images contained in the multimedia presentation are transferred to working memory through the eyes and ears, which are the main components of our sensory memory. The words are transferred orally whereas the images are transferred on a visual channel. Prior to the transfer, the remarkable and appealing ones are selected from the words and images on the sensory memory. In the working memory, the oral models are created from words or sounds and visual models are created from images. This stage can be defined as the organization stage of the data. Finally, the new information resulting from the formation of models is integrated with the previous information in the long-term memory (Mayer & Moreno, 2003; Akkoyunlu & Yılmaz, 2005). The theory has seven design principles (Mayer, 1999):

- **Multimedia principle:** Verbal and visual presentation of information is more effective than a stand-alone presentation.
- **Spatial contiguity principle:** Presenting the verbal and visual expressions that are associated with one another in close proximity is more effective than presenting them from a distance.
- **Temporal contiguity principle:** Presenting the verbal and visual concepts that are associated with one another in the material simultaneously is more effective than presenting them consecutively.
- **Coherence principle:** A presentation that includes only relevant subjects is more effective than a presentation with unrelated content items.
- **Redundancy principle:** The visual and auditory presentation of information is more effective than textual and auditory and visual presentation.

- **Modality principle:** Visual and auditory presentation of information is more effective than visual and textual presentation.
- **Individual differences principle:** The design of the material has more effect on individuals with less information and less spatial ability.

1.1.2. Cognitive Load Theory (CLT)

Analyzing the study process of the human mind, there are three types of memory. The first one is the sensory memory where we pick up and evaluate environmental stimuli, the second one is the short-term memory where the data transmitted from the sensory memory is kept for a short period of time and the last one is the long-term memory where the data selected from the short-term memory is permanently stored (Gülten et al., 2012). Short-term memory is also known as working memory. Having regard to the limitations of working memory, the CLT is looking for ways to use this memory effectively and efficiently (Paas, Tuovinen, et al., 2003). The CLT establishing a framework for cognitive processes and instructional design issues was initially introduced by John Sweller in 1980 (Paas et al., 2003). The amount of information that the working memory requires to process at once is called cognitive load. There are three different types of cognitive load including intrinsic cognitive load, extraneous cognitive load, and germane cognitive load (Akkoyunlu & Yılmaz, 2005). Intrinsic cognitive load is a type of load that cannot be intervened and is associated with the information to be presented. Extraneous cognitive load is a type of load associated with the presentation of information, the methods of presentation and the material itself to be presented. Germane cognitive load is a load influenced by instructional designers as extraneous cognitive load and formed as a result of the converting information into a schema (Paas et al., 2003).

CLT provides a set of principles for researchers on what to pay attention to in the presentation of instructional content and what aspects they should address during the designing process. Within the scope of the study, only those that were considered in the designed materials are included. These principles are as follows (Akbulut, 2017; Mayer & Moreno, 2003):

- **Segmenting and sequencing:** This principle states that content can be presented more effectively when divided into meaningful pieces rather than presenting it as a whole, and this reduces the cognitive load on learning.
- **Mental rehearsal:** In the principle, it is stated that rehearsing, i.e. repeating the lessons learned, in mind is required, which would result in more meaningful learning.
- **Social cues:** This principle emphasizes that the language used during the education process or in the material should be unofficial and warm.
- **Split-attention:** This principle emphasizes that the interrelated content should be presented simultaneously and spatially close to one another.
- **Signaling:** This principle points out that the parts of the content that are important and need to be emphasized should be presented in a clear manner.

1.1.3. Purpose and Research Questions

In brief, personality is a critical concept affecting career choice, job satisfaction, and success. Low CDMSE leads individuals to experience career indecisiveness. On the other hand, multimedia has positive contributions to the learning process. ICT can help with vocational counseling services; however, there are very few studies on the use of multimedia in career counseling. In this study, therefore, it is aimed to teach Holland's Theory to secondary school students by designing multimedia and to let the individuals recognize

their personalities in light of this theory and to increase their CDMSE. Our study addresses three research questions:

1. Does the use of multimedia increase the career decision-making self-efficacy of the students?
2. Do multimedia help students learn a career theory?
3. Have students found the developed multimedia useful?

2. Methodology

2.1. Participants

Simple random sampling method was used in the sample selection of this study. Simple random sampling, on the other hand, is a sampling method that gives every individual in the population an equal chance of being selected (Büyüköztürk et al., 2022).

Participants were 68 8th-graders studying at a secondary school in Balıkesir, Turkey in the 2015-2016 academic year. These students were randomly assigned to experimental and control groups. While there were 17 females and 17 males in the experimental group, there were 16 females and 18 males in the control group.

2.2. Research Instruments

2.2.1. Videos

Four videos were designed primarily to teach Holland's Theory in the light of MLT and CLT in this study. Holland's Theory, which is to be explained before designing the material, is divided into sub-topics. Rather than explaining the whole subject at length in a single video, short videos divided into pieces were preferred. It was originally decided to explain the theory in three videos; however, as a result of interviews with subject matter experts, it was decided to add another introductory video to the material. The design of the video materials was started with the selection of the appropriate title for each video and these videos are respectively named as decision-making, personality types, work environments, and individual-profession fit. During the process of video materials designing, ideas were exchanged with subject matter experts in every stage of the process.

In the decision-making video which is the very first video; the decision-making process of individuals, the importance of personality in career choice, some factors affecting the choice of profession, and some career names, and Holland's Theory are briefly mentioned. In the second, the personality types, video; the six personality types stated in the theory, the characteristics of personality types, and the types of activities that these personality types enjoy are addressed. In the third video (work environments); the following issues are mentioned: which work environments these personality types need to work around, the characteristics of these work environments, and the professional groups that stand out in each profession. In the last and the fourth video, the individual-profession compatibility video, it is emphasized that the individual should work in a work environment compatible with his/her personality and it is mentioned what other work environments are compatible with the individual.

In each video material designed in the scope of this study, the CLT theories of segmenting and sequencing, mental rehearsal, social cues, split-attention, and signaling principles are used. Descriptions on how each principle is used in materials are as follows:

- **Segmenting and sequencing principle:** The content was organized in four separate videos rather than one single video in order to ease the burden of working memory. Thus, potential learning difficulties were also prevented.

- **Mental rehearsal principle:** It was paid attention to repeating the content regularly and at regular intervals in the video materials. In intermediate videos; short and important reminders on the previous video and various information on the content of the next video are included. It is aimed to increase the memorability of the learned subjects by frequent repetitions.
- **Social cues principle:** In the presentation of the content, an official language was avoided and it was tried to use a warmer language. The following sentences can be given as an example of the use of the principle: "Have you ever tried to look more closely at the objects with the help of a magnifying glass? Or have you ever spent hours to solve a logical problem?"
- **Split-attention principle:** The associated visual and verbal expressions in the video materials were presented simultaneously. However, associated visual and textual expressions in the design were also physically located in close proximity to each other. A sample screen design on the use of the principle is included in the MLT. Within the scope of this principle, the design elements that may pose a burden on the working memory were avoided.
- **Signaling principle:** Special attention was paid to presenting significant visual or textual expressions in the content in a clear and emphasized manner. In order to highlight some important parts in the materials, the insignificant parts were blurred. Some important parts are either underlined or painted in a different color or written in a different font type or size. The following is an example of the screen design of this principle.

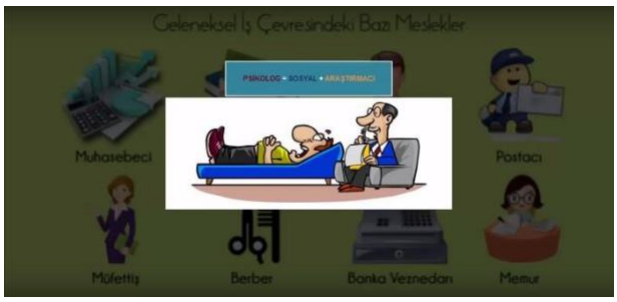

Fig. 2. An example of the signaling design principle.

In addition to the principles of the CLT, the four videos designed in the seven principles of MLT were also tried to be used effectively. The use of the principles are as follows:

- **Multimedia principle:** The presentation of the content in each video material was supported both visually and verbally. Thus, the subjects that were intended to be presented in the materials were designed to address multiple senses.
- **Spatial contiguity principle:** The associated visual and verbal expressions in each video material were physically positioned close to one another. Sample screen design on implementation of the principle is as follows:

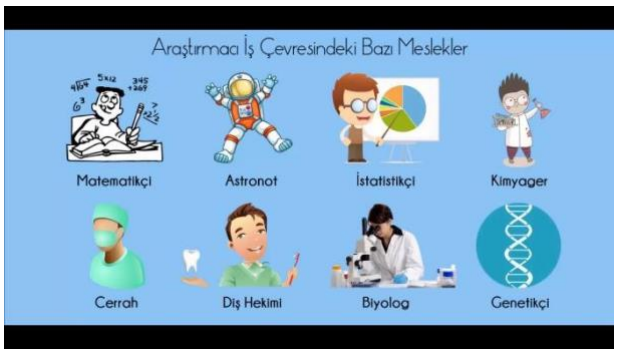

Fig. 3. An example of the spatial contiguity principle design.

- **Temporal contiguity principle:** The associated visual and verbal expressions in each video material were simultaneously presented. Besides, consecutive presentation of the associated expressions was avoided.
- **Coherence principle:** There were no design elements that were not related to the content in the video material. All items considered to be unnecessary were removed from the material.
- **Redundancy principle:** The textual presentation was avoided for the information that was presented audibly and visually in each video material. Therefore, presenting textually comprehensible content also as audio was prevented.
- **Sensory modalities principle:** It was paid attention to the visual and audio presentation of the information contained in each video material while avoiding the visual and textual presentation. Therefore, the verbal information contained in this material was presented orally.

Additionally, it was paid attention to the simultaneous presentation of the visual and auditory elements in the materials. Sample screen design on the implementation of the principle is as follows:

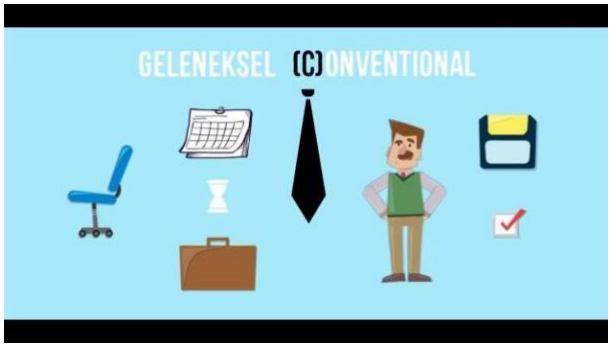

Fig. 4. An example of the sensory modalities principle.

Individual differences principle: It was assumed that the students did not have any knowledge on the subject explained in the video materials; and that the students in the experimental group taking part in the study had an average spatial ability.

2.2.2. Career Decision-Making Self-Efficacy Scale (CDMSES)

CDMSES was developed on the basis of the Career Decision-Making Competence Scale (CDMCS) that had been prepared based on the social cognitive career theory and self-efficacy theory of Bozgeyikli (2004) for eighth-grade students. CDMCS is originally a 5-point Likert- type scale composed of 27 items and 3 sub-dimensions including "accurately assessing personal and professional characteristics", "gathering information about the professions" and "making realistic plans". In the study conducted on 180 students, the internal consistency coefficients calculated for each factor were .89, .87, and .81 respectively, and the internal consistency coefficient of the whole scale was reported to be .92.

In line with the objectives of our study, out of three sub-dimensions, it is only focused on the "accurately assessing personal and professional characteristics" dimension and settled that five of the 11 questions in this dimension were directly related to our objectives. Additionally, based on the interviews with experts, it is decided to include three additional items to the scale by making small changes in the writing style of the items.

Briefly, CDMSES used for this study consists of a single dimension called "accurately assessing personal and professional characteristics" and has eight questions. "I ... myself to be able to make approaches towards the profession/field that I believe that I will be successful in", "I ... myself to be able to make approaches towards the profession/field that is suitable with my personality (my interests and skills, etc.)" are two example items in this scale. Participants also indicated their responses on a scale ranging from one

(not at all confident) to five (fully confident). Then, the average score of each participant was calculated by dividing the total score by the number of questions. Therefore, the scores that the participants acquired from this scale ranged from one to five. High scores refer to high self-efficacy values while low scores refer to low self-efficacy values.

2.2.3. Material Evaluation Form (MEF)

MEF also consists of eight Five-point Likert-type questions. The questions in the MEF were prepared in line with both the objectives of the study and the target behaviors that the students had been expected to obtain as a result of training with the materials. The average score of each participant was calculated by dividing the total score by the number of questions. Therefore, the scores that the participants received from this scale ranged from one to five as in CDMSES. High scores indicate that participants found the developed video material useful. All of the questions in the form and the average score of the participants are presented in Table 1.

2.2.4. Holland's Theory Learning Test (HTLT)

HTLT has 10 questions including six multiple-choice questions, two matching questions, one fill-in-the-blank question, and one open-ended question, which were prepared under the guidance of two experts on guidance and psychological counseling. Two of the questions are presented in the findings section. The average score of each participant was calculated by dividing the total score by the number of questions. Therefore, the scores that the participants acquired from this scale ranged from one to 10. Higher scores indicate higher performance.

2.2.5. Application

Before presenting the video materials in the experimental study stage, CDMSES was applied to both the experimental group and the control group to find out whether there is a statistical difference between the two groups. The experimental group students watched the designed video materials in the computer laboratory with personal computers and headphones. The control group students, on the other hand, did not receive any training on Holland's Theory. After the presentation of the videos, CDMSES was re-applied to both the experimental and control group students. ANCOVA test was also performed considering that pre-test scores of students might have an effect on post-test scores. The pre-test scores of the students were assigned as covariate variables and the post-test scores of the experimental group and the control group obtained from the CDMSES were compared. Following the application, the MEF and HTLT were also applied for experimental group students. Descriptive Statistics (mean, standard deviation) were calculated to determine how useful the experimental group students found the material and how much they learned from the theory.

2.2.6. Data Analysis

Prior to the experimental study, since the fundamental changes were made on the CDMCS developed by Bozgeyikli (2004), the structural validity of the CDMSES was tried to be proved primarily on another sample group (69 students of 8th-grade). For this purpose, principal component analysis was performed and one factor with more than one eigenvalue was expected to emerge. Cronbach's alpha was used as an indicator of internal reliability.

3. Results

The eigenvalue of the principle component analysis performed on the CDMSES was found to be greater than one factor. This factor explained 45% of the total variance. The Cronbach alpha value of the scale was found to be 0.82. These results proved the reliability and construct validity of the scale.

In terms of CDMSES pre-test scores, the difference between the experimental group students (M= 3.94; SD = 0.82) and the control group students (M= 3.93; SD = 0.72) was examined. As expected, no statistically significant difference existed (t = 0.01, p = 0.99). The score of students in the experimental group increased by 0.28 points to 4.22 (SD = 0.80) in the post-test. Dependent sample t-test results showed that this increase was significant (t = 2.44, p <.01). The control group students' scores increased by 0.10 points to 4.03 (SD = 0.73), but this increase was not significant. In other words, while students in the experimental group statistically increased their scores from pre-test to post-test, the scores of students in the control group remained statistically the same. However, no statistically significant difference was found between these two groups (t = 1.03, p = 0.30) in terms of post-test scores.

As mentioned earlier, the ANCOVA test was also performed considering that pre-test scores of students might have an effect on the post-test scores. The pre-test scores of the students were assigned as covariate variables and the post-test scores of the experimental group and the control group obtained from the CDMSES were compared. As a result of the ANCOVA test, it was found that the initial significance value (p = 0.30) decreased to 0.10, but the difference that emerged with this decrease was not statistically significant. Although this value (0.10 value) is greater than the critical significance value of 0.05 as accepted in social sciences, the value of 0.10 is relatively close to 0.05 (F (1.65) = 2.758; p = 0.10).

The average score of eight questions asked in MEF was calculated as 4.22 (SD = 0.89) over five points. This result indicates that students find video materials useful and effective. More specifically, the percentages of students' responses to MEF were calculated based on the questions, and the most positive answer was given to question seven, "I have realized how important the role of the personality is in career choice.". In this question, 58.8% of the students selected "Strongly Agree" and 32.4% of the selected "Agree". The highest average score value calculated for this question is 4.35 (SD = 1.09). Moreover, the average score value calculated over five points for each question was found to be more than four. In addition to the general average, the fact that question-based averages are so high is another indication that the material is found useful and effective by the students. All of the questions in the form and the average score are presented in Table 1.

Table 1.

The Percentage of Responses to Questions in the MEF.

	Thanks to the videos I have watched describing the Holland's Theory …	**Strongly Disagree**	**Disagree**	**Neither agree nor**	**Agree**	**Strongly Agree**	**Mean (standard**
1	I have learned to see the Career Choice from a different perspective.	2.9	5.9	2.9	32.4	55.9	4.32 (1.00)
2	I have had the opportunity to recognize my personality traits (my interests and capabilities etc.) more closely.	0	5.9	8.8	55.9	29.4	4.09 (0.79)
3	I have had the opportunity to get to know the professions better.	5.9	2.9	5.9	35.3	50	4.21 (1.09)
4	I have learned about what kind of personality traits should go for what professions (e.g. teaching-social, attorney-entrepreneur personality traits).	5.9	0	2.9	41.2	50	4.29 (1.00)
5	I have realized what occupations are suitable to my personality (interests and abilities, etc.).	2.9	5.9	5.9	41.2	44.1	4.18 (0.99)
6	I believe I can make more accurate decisions on the profession/field choice.	2.9	11.8	8.8	20.6	55.9	4.15 (1.18)
7	I have realized how important the role of the personality on the career choice.	5.9	2.9	0	32.4	58.8	4.35 (1.07)
8	I have learned the reason why I should work in a profession suitable for my personality type.	5.9	2.9	5.9	35.3	50	4.21 (1.09)
Average Percentage obtained by Students							**4.22 (0.89)**

In the meanwhile, the average score of the students in the 10-question HTLT was 8.5, and the scores ranged from 7.06 to 10 points. The most difficult question for the students (M = 7.06) seemed to be the first question ("Ahmet is a child who likes to work carefully, meticulously, regularly, and systematically. Although he lacks imagination, he is capable of self-control. And in the future, he would like to be a good accountant. According to what you have learned, which of the following do you think Ahmet's personality type might be?"). In other words, some students had difficulty in learning the "conventional" personality type. However, in the fourth question with the highest average (10) "Derya has been a student who been curious about researching and examination since primary school and she is sitting in the front row in the science experiments and taking many notes while the teacher is performing an experiment. Because she thinks she is a good observer, she raises some questions to the teacher about what he does and for what purposes. Which of the following do you think best reflect the personality traits of Derya? It was found that the students had learned the individuals with "investigative" personalities well.

4. Discussion

In this study, it is aimed to increase the CDMSE of 8th-grade students through multimedia. In order for students to get to know the personality characteristics and professions better, Holland's Theory, which is one of the popular professional development theories, was tried to be taught. Multimedia-aided video materials were designed in line with the multimedia learning and cognitive load theory principles to facilitate the learning process and to make it more efficient and effective. Most importantly, it is aimed to create career awareness among students through this study.

The findings of the study showed a statistically significant increase in CDMSE scores of experimental group students. However, compared with the control group, there was no statistical difference in the post-test between the experimental group and the control group students. The main reason behind this is that

there was an unexpected increase of 0.10, for an unknown reason, in the control group students' points. It might be caused by a measurement error or else the current psychological state of the individuals.

Although there is no statistically significant difference in CDMSE scores when compared with the control group, it is noteworthy that although the scores of the experimental group students were high at the beginning with a single application, this score increased by 0.28 and this increase was statistically significant. Additionally, the results indicated that students learned Holland's Theory well based and found video materials effective and efficient. One of the major contributions of this study to the literature is that Holland's Theory taught at the university level can be taught easily and efficiently to students at the primary school level with the help of the use of multimedia. This finding of the study revealed that career counseling or career information services can be provided through multimedia materials. This result is also in parallel with the study of Salimah et al. (2019) showing that multimedia can be used in career counseling.

Another point that should be addressed at this point is that individuals do not like to read a lot of text online. Thus, a learning environment with increased interaction should be provided (Herman, 2010). According to Baharudin et al. (2019), students prefer a video tutorial rather than plain text. Videos help students understand the topic better and maximize their attention. Besides, it helps them remember what has been learned better. According to a study conducted in 2010, video learning has become the third most popular learning method (Baharudin et al., 2019). The fact that YouTube is found to be the most commonly used resource on social media for education in the following years (Balakrishnan et al., 2015) supports this finding. Thanks to multimedia-aided video materials, Holland's Theory, which is a scientific theory, was easily learned by primary school students. This shows how accurate and useful the design principles offered by MLT and CLT are. Other researchers can use the principles of these theories to design different multimedia materials that can be used in career counseling.

The biggest restriction of our study is that the presented material was not interactive. Although the materials we have developed are visual and instructive, individuals receive information passively. Multimedia applications that will make students more active in the learning process can help them learn better and develop their self-efficacy accordingly.

5. Conclusion

Despite the above-mentioned restriction, this study has shown that multimedia can be used in career counseling at the primary school level. As a result, it is possible for students to make more realistic decisions in their future professional choices thanks to the information they acquired about themselves and their professions. It is believed that career awareness was created in the students participating in the study and video materials can be used by primary school counselors within the scope of vocational promotion activities.

In future studies, researchers can achieve better results if they; conduct their studies on a larger sample group, spend more time and effort increasing their self-efficacy, allocate enough time for the experimental group, and select individuals with an average CDMSE for the study sample.

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