Comparison of the Impacts of Telementoring Services on Protégés' Academic Achievements and Opinions

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Abstract

The aim of the research is to compare the impacts of telementoring services, delivered using chat with video, chat with instant message, mobile phone, discussion board and video conference on protégés' academic achievements and opinions. Telementoring services, made up with five different instruments, were administered to a group of protégés, composed of 38 university students. In the research, the multiple-choice achievement test, which consisted of twenty-four 4-point Likert items, was utilized in order to determine protégés' academic achievements. On the other hand, protégés' opinions were determined through open-ended questions. The research findings demonstrated that telementoring services formed through using different instruments do not significantly differentiate student achievements between groups. Moreover, positive and negative characteristics regarding the communication instruments used were defined based on protégés' opinions.

Keywords: *Telementoring; chat with video; chat with instant message; mobile phone; discussion board; video conference; protégés*

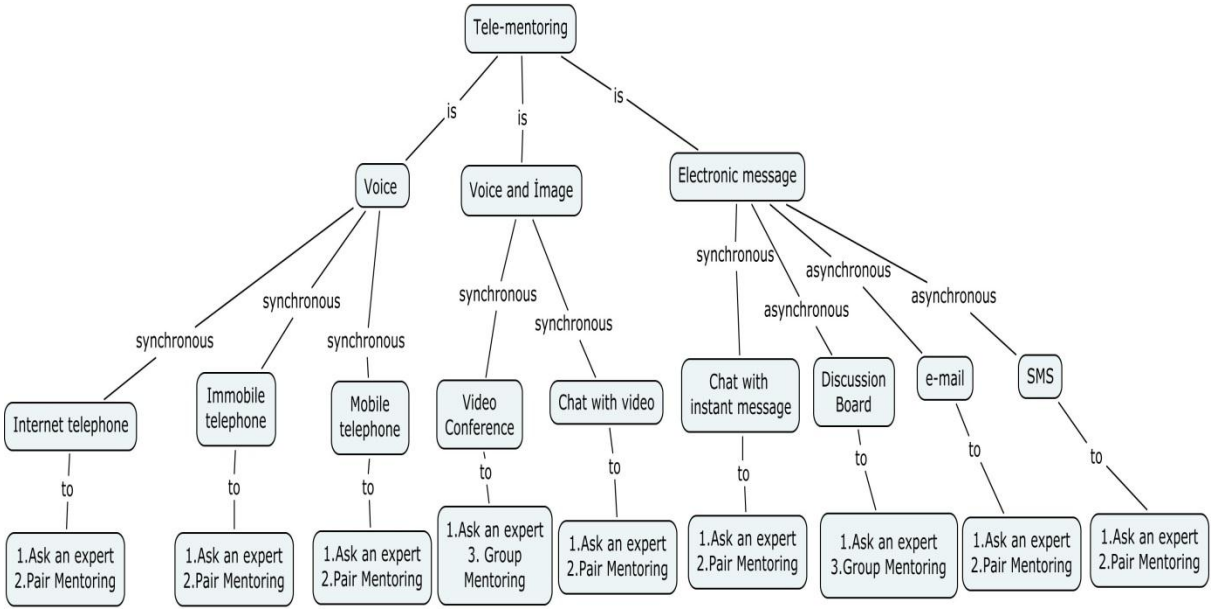
Introduction

Mentoring can be defined in general as maximizing individuals' learning potentials, improving their skills, increasing their performances, and supporting and encouraging them to become the person they want to be. Adams and Crews (2004) indicate that telementoring is the electronic version of mentoring. Single and Muller (1999) define telementoring as a relationship between a more senior individual (mentor) and a lesser skilled or experienced individual (protégé) primarily using electronic communications, and that is intended to grow the skills, knowledge, confidence and cultural understanding of the protégé to help him or her to succeed. O'Neill (2000), on the other hand, defines telementoring as the use of telecommunication technologies to support a mentoring relationship when a face-to-face relationship would be impractical. Telementoring is conducted in three categories (Dorman, 2001; American School Health Association, 2001; Hansman, 2002, Perez and Dorman, 2001): i) Ask an expert: In this format, generally a match between a student and an expert occurs. The protégé asks questions to a more experienced expert in the field to acquire knowledge or to increase his/her knowledge. ii) Pair mentoring: It is a form of mentoring performed by a student and a voluntary expert. Pair mentoring involves practices aimed at educational and social development spread over long time periods. The mentor creates learning possibilities and improves comprehension on the selected field using e-mail, audio or video materials by assuming the role of a model. iii) Group

mentoring: In this form of mentoring, an expert or a group of experts is matched with a group of students through technological instruments. It may be performed for short as well as long time periods.

When considered the definitions and types of telementoring, it is observed that the forms of communication constituted by the instruments used in telementoring are performed in the form of transmission of audio and video, audio and electronic message. The instruments that enable the creation of these three forms of communication can be juxtaposed as: audio-video synchronous videoconference, one-to-one chat with video; audio-only synchronous internet phones, land phones, cellular phones; synchronous instant messaging, asynchronous discussion board, asynchronous e-mail and asynchronous sms. Figure 1 presents types of telementoring, and the forms of communication and instruments regarding these types.

Figure1. Types of telementoring, forms of communication that can be used in these types, and instruments that can perform these forms of communication



As is seen in Figure 1, it could be stated that the type of telementoring "ask an expert" can be used in all instruments. In pair mentoring, on the other hand, internet phone, land phone, cellular phone, chat with video, instant messaging, e-mail and sms can be used. In group mentoring, video-conference and discussion board can be used. All instruments except discussion board and e-mail are synchronous.

The literature review, no study was found that compares five different telementoring practices (Chat with Video, Chat with Instant Message, Mobile Phone, Discussion Board and Videoconference) in terms of protégé achievement and opinions and within the scope of the telementoring types (Voice , Electronic message, Voice and Image). The aim of the research is the comparison of the impacts of five different telementoring practices on protégé achievement and opinions, which are formed on the basis of transmission of synchronous audio and video, synchronous audio, synchronous electronic message and asynchronous electronic message between the mentor and the protégé, and within the scope of two types of telementoring "ask an expert" and "group mentoring". To this aim, cellular phone was used for synchronous audio transmission between the mentor and the protégé, chat with video and video conference was used for synchronous audio and video transmission, instant

messaging was used for synchronous electronic message, and discussion board was used for asynchronous message transmission. The telementoring practices in the research were performed within the framework of "ask an expert" in groups where cellular phone, chat with video and instant messaging were used, and of "group mentoring" in groups where video conference and discussion board were used.

Method and Data Collection Tools

The protégé group of the research consists of 38 sophomore (2nd grade) students who take the course "Programming Languages II" (ASP) at the Department of Computer and Instructional Technologies Education (GaziOsmanPasa University/Tokat/Turkey). The first group, where one-to-one chat with video instrument was used between the protégé and the mentor, is composed of 8 students; the second group where video conference was used is composed of 8 students; the third group where cellular phone was used is composed of 8 students; the fourth group where instant messaging was used is composed of 7 students; and the fifth group where discussion board was used is composed of 7 students. Students in these groups received mentoring service in addition to their ordinary education. Synchronous groups attended "ask an expert" or "group mentoring" telementoring services at least one hour per week depending on their types of mentoring. In the asynchronous group, on the other hand, there was not any time limitation. A total of 25 mentors worked in the research; 8 in the first group where chat with video was used, 1 in the second group where video conference was used, 8 in the third group where cellular phone was used, 7 in the fourth group where instant messaging was used, and 1 in the fifth group where discussion board was used. Mentors were 3rd and 4th grade volunteered students, who had received and successfully passed this course. Necessary information was given to the mentors prior to the research about the content and the subject of the research, and the things that need to be done throughout the research. Telementoring services were performed for six weeks. The reason that experienced students were defined as mentors in the study was to ensure the most efficient formation of the mentoring services. Harris and Jones (1999); Harris, O'Bryan and Rotenberg (1996); Lenert and Harris (1994) suggest that matching experienced students with lesser experienced ones as mentors is more influential than matching students with an expert (Lewis at all 2002). In the research, Windows Live Messenger was used for chat with video, Polycom PVX 8.0.4 was used for video conference, and ICQ was used for instant messaging. Asynchronous discussion board was formed under .NET using ASP.NET. The validity and reliability studies of the achievement test of the research were conducted in line with the evidence obtained from Trochim (2001) and Miles and Huberman (1994). Experts were asked to examine the measurement tool to achieve credibility. Five experts in computer and education technologies evaluated the measurement tool and they concluded that it is efficient to fulfill the aims of the study. For what regards transferability, experts' opinion was asked and it was confirmed that the results are generalizable for similar future studies to be conducted in other contexts. The achievement test was prepared 4 licert items and consists of 24 items. Cronbach's alpha is .86. A pre-test was applied to the groups, and after controlling the pre-test results, the groups participate in mentoring services for 12 weeks. Upon completion of the training and participation, the achievement test was applied to the groups as the final test. The students were asked to state the positive and/or negative aspects of the telementoring services they participated in.

Findings and Comments

Findings Related to the Groups' Scores in Achievement Tests:

Comparison of the Achievement Scores Taken from Pretest

Table 1 demonstrates the Kruskal-Wallis H. test results of the scores taken from Pretest be the groups, in which different telementoring instruments are used.

Table 1. Kruskal-Wallis H. test results of the scores taken from Pretest be the groups

Groups	n	Mean Rank	df	x^2	p
Group1st	8	23.38	4	6.83	.14
Group2nd	8	24.19			
Group3rd	8	11.14			
Group4th	7	19.36			
Group5th	7	19.07			

Kruskal Wallis H. test analysis results demonstrated in Table 1 indicate that there is not any significant difference between the achievement scores taken in the Pretest; by the 1st group where chat with video, by the 2nd group where video conference, by the 3rd group where cellular phone, by the 4th group where instant messaging, and by the 5th group where discussion board was used [$(x^2_{(4)} = .14$, $p > .05]$.

Comparison of the Achievement Scores Taken from Posttest

Table 2 demonstrates the Kruskal-Wallis H. test results of the scores taken from Posttest be the groups, in which different telementoring instruments are used.

Table 2. Kruskal-Wallis H. test results of the scores taken from Posttest be the groups

Groups	n	Mean Rank	df	x^2	p
Group1st	8	20.81	4	3.57	.46
Group2nd	8	13.44			
Group3rd	8	19.31			
Group4th	7	23.29			
Group5th	7	21.36			

Kruskal Wallis H. test analysis results demonstrated in Table 2 indicate that there is not any significant difference between the achievement scores taken in the Posttest; by the 1st group where chat with video, by the 2nd group where video conference, by the 3rd group where cellular phone, by the 4th group where instant messaging, and by the 5th group where discussion board was used [$(x^2_{(4)} = .46$, $p > .05]$.

Despite several limitations such as low number of students in study groups, the subject worked on, and limited telementoring durations, research findings demonstrate that protégé achievement does not differ significantly according to whether the telementoring services are provided through video and audio, audio-only or electronic message. Besides, the findings also suggest that student achievement does not differ with respect to several other factors, such as using different types of telementoring as "ask an expert" and "group mentoring", using synchronous or asynchronous electronic message, using synchronous audio and video in the forms of "ask an expert" or "group mentoring". The reason no significant difference was found between groups in terms of protégé achievement might be that all instruments have the same impact on achievement in terms of communication. This idea is supported by the facts that the subject field taught in the research requires expertise, that the information about the subject cannot be accessed easily by means of internet and other resources, and that the learning person is likely to need the knowledge of an expert or an experienced person. Therefore, this interpretation is reached by assuming that the best resource for the protégé to access the relevant knowledge (leaving aside the general limitations of the research) could only be his/her mentor.

Opinions of the Protégés in the Groups on the Instruments and Practices

The protégés were asked to express their opinions on the positive and negative aspects of the process they experienced regarding the practices. The decision tree, which is presented in Figure 3, demonstrates the positive and negative opinions of the protégés on the telementoring practices they participated and on the instruments used in the practices, and the distribution of the opinions among groups.

As Figure 3 shows, 8 protégés in the 1st group where chat with video was used concentrated on 5 opinions; 3 positive and 2 negative. Five of the protégés reported that performing "ask an expert" type mentoring services with chat with video "enables students to get to know the expert individually", seven of them reported that "questions were answered clearly and answers were also received clearly" if chat with video is used, and six of them stated that this method "offers the opportunity of instant feedback and correction". On the other hand, while six of the protégés in the same group reported that "they experienced connection problems in video", three of them stated that "they felt uneasy about video communication". This shows that a great majority of the protégés in this group think that the telementoring service provided by using this instrument makes it possible to know experts individually, in other words it enables establishing informal relationships with experts, that they can receive clear answers to their questions and they can clearly express themselves, and that they find the opportunity of instant feedback and correction. On the other hand, it is observed that most of the protégés in this group experienced connection problems. It is also a notable finding that there exist proteges in this group who are not happy with chatting with video.

In the 2nd group where telementoring was performed using video conference, the protégés gave 2 positive and 4 negative opinions. Five of the protégés in this group reported that the telementoring performed using video conference "offers the opportunity of instant feedback and correction" and six of them reported that "questions were answered clearly and answers were also received clearly". On the other hand, two of them stated that "desired issues could not be expressed adequately", two of them stated that "the mentor could not allocate enough time for the group members", three of them reported that "they do not want to be in the same group with those to whom they do not feel intimate", and the entire group reported that "they experienced technical connection problems".

In the 3rd group which was designed in the form of "ask an expert" by using cellular phone based on synchronous audio transmission, protégé opinions centered around 3 positive and 2 negative opinions.

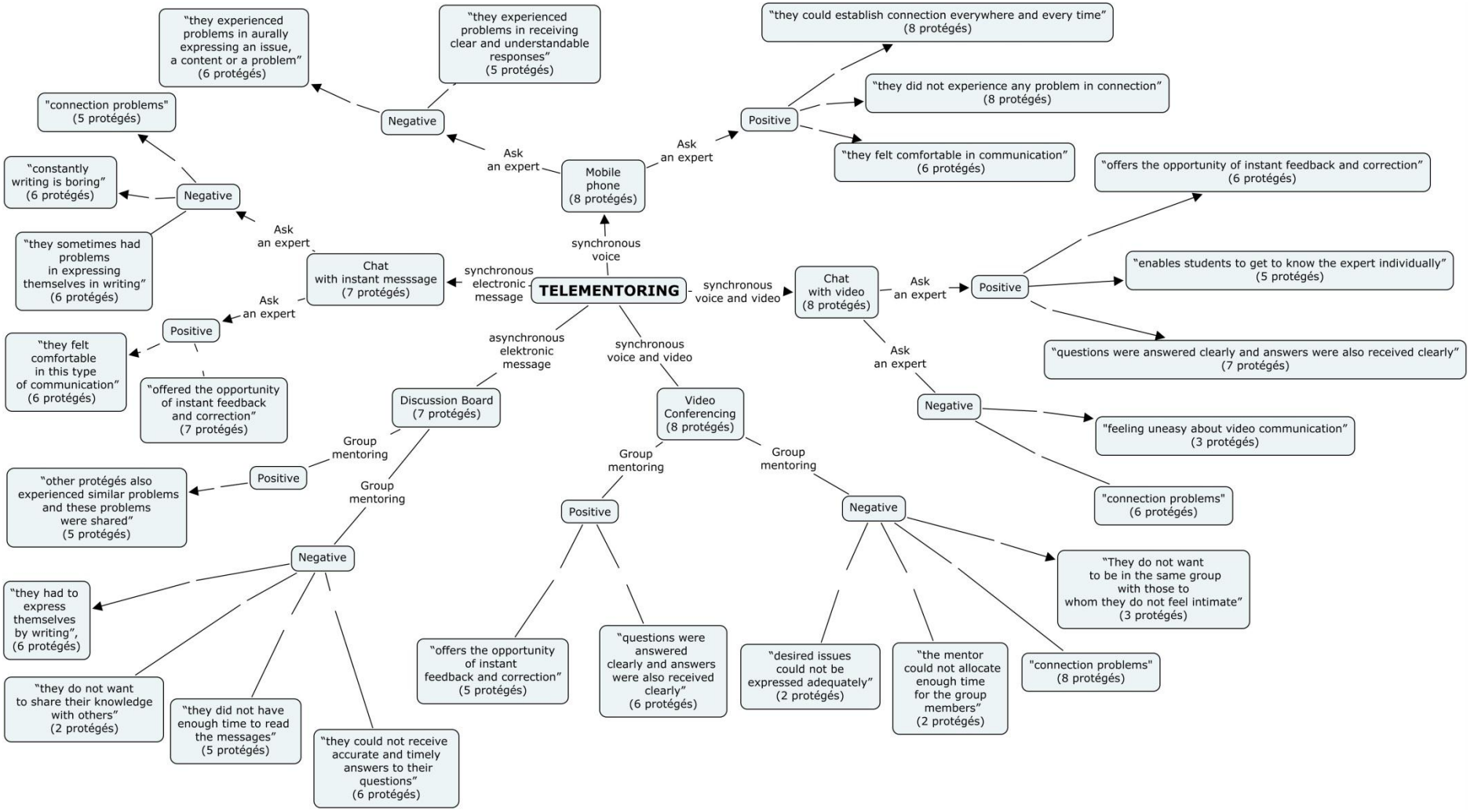
While six of them reported that "they felt comfortable in communication", all of them stated that "they could establish connection everywhere and every time" and that "they did not experience any problem in connection". However, six of the protégés reported that "they experienced problems in orally expressing an issue, a content or a problem", and five of them stated that "they experienced problems in receiving clear and understandable responses". In general, it could be stated that the use of voice as synchronous mobile between the mentor and the protégé is considered by most of the protégés to be an instrument which is; easy-to-communicate, easy-to-connect and free from technical connection problems; however, due to the technological characteristic of the device, they experienced problems in receiving clear and understandable responses to questions and in orally expressing themselves.

In the 4th group where synchronous instant message was used, protégés concentrated around 2 positive and 3 negative responses. Six of the protégés reported that "they felt comfortable" in this type of communication, and all of them stated that this instrument "offered the opportunity of instant feedback and correction". However, six of them stated that "they sometimes had problems in expressing themselves in writing", six of them stated that "constantly writing is boring" and five of them reported that "they experienced connection problems".

In the 5th group where the communication between the mentor and the protégés was established through discussion board, opinions concentrated around 1 positive and 4 negative options. Six of the protégés in this group stated that "they had to express themselves by writing", two of them stated that "they do not want to share their knowledge with others", five reported that "they did not have enough time to read the messages", and six of them stated that "they could not receive accurate and timely answers to their questions". Besides, five of the protégés reported that "other protégés also experienced similar problems and these problems were shared", which was a positive feature according to them. These findings are in parallel with the findings of the study carried out by Oliver and Shaw (2003), in which they investigated the impact of asynchronous forum practices on student opinions.

Findings of the groups, in which video conference and chat with video were used, are similar to each other. The point that makes the difference in terms of protégés' opinions is the fact that one of them was conducted in the framework of "ask an expert" and the other was carried out in the framework of "group mentoring". There are similar problems and advantages. Whereas technological problems were experienced in both groups, protégés in both groups received clear responses to their questions. Some protégés in the group in which chat with video was performed in the form of "ask an expert" reported that they felt uneasy about chatting with video. No such opinion was received from the group in which video conference was used. Departing from this , it is an interesting point, which needs to be stressed on, that protégés are more comfortable in synchronous applications where audio and video are used than they are in individual or matched situations in group practices. Another point is that group dynamics might be influential in the communication process in the group in which video conference is used. Protégés interact here not only with the mentor but also with other protégés, thus the intimacy and attitudes among protégés within the group might also influence the telementoring process and practices. Some protégés in the video conference group expressed their discomfort in sharing the same group with some other protégés. Atack and Lefebre (2003) suggest that such problems are the disadvantages that need to be overcome in the telementoring process.

Figure 3. Decision tree related to the protégés' opinions



It could be stated that the types of telementoring that show similarities with face-to-face mentoring are those conducted through video conference and chat with video instruments. What is common in all three of them is synchronous audio and video transmission. In this case, it could be stated that the communication between the protégé and the mentor goes mostly along the lines of daily communication principles. As Nellen (1998, 1999) suggests, the relationship between the mentor and the protégé is a relationship in which mostly emotions and individual characteristics are set to work and the conditions are similar to those in the face-to-face mentoring. This has positive and negative aspects; establishment of mutual trust and sincerity is highly difficult, but once it is established, it is likely to be highly successful and strong (Dorman, 2001). Besides, most of the protégés in the group in which chat with video was used reported that they had the chance to know their mentors individually, in other words, to establish informal relationships. Li, Finley and Pitts (2008) suggested that informal interactions between the mentor and the protégé have positive impacts.

It is observed that the protégés felt comfortable in the communication processes in which only audio and only message transmission (cellular phone, instant message groups) was conducted, however and they felt uncomfortable in audio and video communication (chat with video). Surprisingly, a great majority of those protégés who reported that they felt comfortable in the communication processes where these instruments were used also reported that they had problems in expressing themselves using the same instruments. Moreover, it was observed that the technical connection problems, similarly underlined by Furr and Ragsdale (2002), were seen in those groups in which video conference, chat with video and instant message were used, while such problems were not experienced in groups that used cellular phone and discussion board. It is seen that one of the main problems of electronic message groups is that protégés have problems in expressing themselves depending on the technology utilized. Kochan and Pascarelli (2005) underlined the same situation and described it as the inferiority of written communication to visual communication.

Conclusion and Suggestions

Researchers like Harris, (1999); Rao, (1999); Brotherton, (2001); Single & Muller, (1999), Dorman (2001) suggested that telementoring improves academic achievement. Therefore, the idea that telementoring improves protégés' achievements is one of the reference points derived from previous studies. Findings of the current study, despite its limitations, demonstrate that telementoring services created by using chat with video, cellular phone, instant messaging, discussion board and video conference do not significantly differentiate protégés' academic achievement. In addition, it was also concluded that protégés' academic achievement does not differ according to whether telementoring services are provided in the forms of "ask an expert" or "group mentoring", whether electronic message is used synchronous or asynchronous, and whether synchronous audio and video is used in different forms like "ask an expert" or "group mentoring". The reason no significant difference was found between research groups in terms of academic achievement might be the fact that all instruments have the same communicational impact on achievement; no matter they are used individually or on a group basis, synchronous or asynchronous.

Instruments used in telementoring practices offer advantages and disadvantages that stem from their natures and ways of use. Paying attention to these characteristics while designing telementoring practices may help using these instruments efficiently. First of them is chat with video, which is used in pair mentoring and ask an expert. In chat with video, protégés and mentors may have the chance to know each other better and to develop informal relationships, however, this can only be possible if mutual trust and sincerity is established. Considering the fact that individuals may feel uneasy about video talks in the use of this instrument, it might be used according to the sensitivities of the users, or

a different type might be employed. Video conference, which is another audio and video instrument, is used in telementoring. In this method, not only the mentor and the protégés, but also protégés among themselves interact. Therefore, group dynamics might be taken into consideration while forming groups and individuals who are thought to interact with each other well might be brought together. In addition, since video conference is a group practice, integrative approaches like equal amount of time and equal right to speak to group members might be beneficial. Besides, it could be argued that the instruments with which most problems are experienced depending on the technology utilized are those that are used in audio and video transmission (video conference and chat with video). Yet another instrument is cellular phone. It could be stated that the most negative significant feature observed in the use of cellular phone between the protégé and the mentor is the possible problems that can be experienced in expressing oneself with voice. On the other hand, it could also be stated that cellular phone has certain advantages that outscore the problems, such as the facts that it is easy-to-use, that its technical infrastructure is stronger than other instruments that transmit audio and video, and that it can be accessed easily. The biggest disadvantage of mentoring activities performed by using cellular phone is the possible problems in expressing oneself with voice, and this disadvantage might be overcome by using the technique "reflective listening" as much as possible. It could be stated that technical connection problems are experienced in instant messaging instrument, although not as much as in video conference or chat with video. In addition, it should also be taken into consideration that this instrument might create other problems such as problems in expressing oneself only in the written form and problems of clarity observed when questions and responses are exchanged in the written form. However, this instrument has advantages that could bring into the forefront such that it enables the protégé to feel comfortable in the communication process and it makes instant feedback and correction possible. On the other hand, since discussion board is an instrument that functions on the basis of asynchronous message transmission, the problems in expressing oneself in the written form are also pertinent to this instrument. In addition, this instrument has other negative characteristics such as inability to receive timely and accurate responses, and time-consuming due to the fact that responses should be checked at certain intervals since it is an asynchronous instrument. In group discussions, treating equally to each student while conducting the discussion board and providing timely and accurate answers to questions sent to the discussion board might increase the effectiveness of this instrument for mentors. Horowitz (2004) suggests the use of a precise language, and compliance with grammar and punctuation principles in synchronous and asynchronous instruments in which written communication technology is used (instant messaging, discussion board).

In conclusion, which instrument and type should be preferred if each telementoring instrument has its own advantages and disadvantages and if telementoring types and instruments make no difference in academic achievement? At the point the research brought us, it is believed that using telementoring in courses might be beneficial. The factors that influence the selection of the type and instrument of telementoring can be juxtaposed as follows: the objective and content of telementoring, characteristics of protégés and mentors, instruments that can be used, general positive and negative features of telementoring instruments, availability of telementoring instruments and their costs (if any), respectively. The instrument and type to be used in the application can be determined, by evaluating the desired telementoring practice according to the above-mentioned factors.

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