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Impressions of Preservice Teachers about Use of PowerPoint Slides by Their Instructors and Its Effects on Their Learning

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Abstract

This study aims to explore preservice teachers' opinions about their instructors' use of PowerPoint slides during classes. To this end, 10 preservice teachers were selected through convenience sampling and semi-structured interviews were then conducted. The interviews were held one-by-one and audio recorded after having received permission from the interviewees. The recorded audio data was then transcribed and subsequently coded using QDA Miner Lite analytical software. Data analysis was then carried out by two researchers in order to eliminate bias and to enhance objectivity in the qualitative coding process. The findings indicated that the preservice teachers, in terms of the design and content of their instructors' PowerPoint slides, complained mostly about text inefficiency, whereas they favored the visual aids used in the slides. The findings also indicated that in terms of the perceived effects of using PowerPoint on preservice teachers' learning, they favored the slides because of their simplification of the content, using PowerPoint as multimedia, using PowerPoint slides as course notes, and for following the course content easier. On the other hand, they complained about instructors' frequently just reading from the slides verbatim. The findings of the study may inspire instructors to use PowerPoint more effectively in their classes, and thereby to become better role models to the preservice teachers they are instructing.

Keywords: PowerPoint, Slides, Effect of Slides, Slides Use in Classes, Presentation

Introduction

Presentations are an indispensable part of our academic, professional and personal lives, in terms of the way in which we use them in universities, K-12 schools, the workplace environment, as well as in the military and the courtroom in different ways such as lectures, class presentations, webinars, product introductions, speeches and court arguments (Kosslyn, Kievit, Russell, & Shephard, 2012; Moulton, Türkay, & Kosslyn, 2017). Although various products exist for such purposes, PowerPoint enjoys the reputation of being the mostly widely used standard presentation application on the market (Garner, Alley, Gaudelli, & Zappe, 2009; Hopper & Waugh, 2014). According to reports, 30 million PowerPoint presentations are made each day; that's 1.25 million every hour (Mahin, 2004, as cited in Hill, Arford, Lubitow, & Smollin, 2012) – "we can only imagine what that number is today" (Kosslyn et al., 2012, p. 1). In referring to PowerPoint's popularity, Parker (2001) said: "to appear at a meeting without PowerPoint would be unwelcome and vaguely pretentious, like wearing no shoes" (p. 2).

In recent years, we have witnessed significant changes in the way in which we use media in schools and have "gone from the era of 'chalk-and-talk' and occasional flip-charts to overhead transparencies and to PowerPoint slides" (Craig & Amernic, 2006, p. 149). PowerPoint has become one of the ubiquitous media dominating "the world of teaching and training, from elementary school classrooms to graduate programs" (Hopper & Waugh, 2014, p. 30). Yet, the use of PowerPoint has been subject to significant criticism and skepticism in the literature (Hill et al., 2012; Hopper & Waugh, 2014). PowerPoint has generated considerable interest among educational researchers about how effectively and efficiently it can be utilized in education, with research having been conducted regarding its pedagogical outcomes. However, much of the literature is based on anecdotal and speculative studies (Hopper & Waugh, 2014; Kosslyn et al., 2012; Moulton et al., 2017; Savoy, Proctor, & Salvendy, 2009). What is more, despite this interest, very few studies have addressed preservice teachers'

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perceptions and opinions about the way in which their instructors use presentation tools in their lectures (Abdelrahman, Attaran, & Hai-Leng, 2013; Savasci Acikalin, 2011; Yilmazel-Sahin, 2009). With this in mind, the aim of the current study is to broaden current knowledge of the effectiveness of PowerPoint slide technology by exploring the phenomena in terms of preservice teachers' perspectives. To this end, the study collected data from 10 preservice teachers via semi-structured interviews. It is considered important to understand how teacher educators implement such technology, considering that preservice teachers will probably utilize similar technologies themselves in their future profession, and therefore the teacher educators act as role models to the preservice teachers they instruct (Yilmazel-Sahin, 2009).

Literature Review

According to the literature, PowerPoint is one of the most used technologies both by students and teachers at schools. It seems that there is an implicit premise that the use of PowerPoint is regarded to be equal to the use of ICTs in teaching and learning. When teachers are asked to report on their ICT usage in the classroom, they mostly mention their PowerPoint practices (Abdelrahman et al., 2013; Hopper & Waugh, 2014; Reedy, 2008; Savasci Acikalin, 2011). However, the literature has addressed both the advantages of using this technology and also levelled certain criticism at its usage.

Advantages of PowerPoint

Learning theories explain how PowerPoint can contribute to teaching and learning. For example, dual channel assumption posits that people have two distinct channels for processing visual and auditory information (Paivio, 1986). Additionally, Cognitive Theory of Multimedia Learning (CTML) postulates that when multiple sources of information are presented (i.e., both visual and auditory), learning is enhanced (Mayer, 2009). As reported by Levasseur and Sawyer (2006), PowerPoint slides may provide opportunities for instructors to couple-up visual information and verbal information, which may lead to better learning. In addition, slides may be well suited to the needs of different learners who possess different learning styles (e.g., visualizers and verbalizers), as they enable instructors to present multiple sources. Arousal theory is another theoretical framework used to explain how slides can aid learning (Levasseur & Sawyer, 2006). Accordingly, attractive course materials make learning more enjoyable, stimulate students' interest, and promote learning (Weiner, 1990). PowerPoint may augment arousal levels, as it can stimulate both the visual and auditory senses.

PowerPoint is an easy to use, stable technology, which readily comes with the Microsoft Office package of programs. Inexperienced students and instructors can use this technology with little effort or technological or instructional know-how. Instead, they can focus on their content and design skills rather than learning the technology, which would require higher-level knowledge or complex technical skills (Hertz, van Woerkum, & Kerkhof, 2015; Hopper & Waugh, 2014). Another advantage of PowerPoint is that for larger class sizes, information dissemination can be easier and more efficient with slides compared to smaller class sizes (Hill et al., 2012; Yilmazel-Sahin, 2009).

Teachers can organize their thinking through PowerPoint, in planning what they should present. Teachers can also support and enhance the message they deliver via well-prepared presentations. They can also incorporate hypermedia tools such as graphics, images, animations and sound into their PowerPoint presentations. Research has shown that learning is improved when more than one information source (i.e., visual and auditory) is engaged (Mayer, 2009).

PowerPoint allows for the improvement of organization of both lectures and lecture notes (Levasseur & Sawyer, 2006; Nouri & Shahid, 2005). Lessons supported with slides are perceived by learners as being more organized, since key elements of the topics to be covered can be emphasized and highlighted using slides (Susskind, 2008), and therefore appear more "clear and interesting" (Apperson, Laws, & Scepansky, 2008, p. 150). In addition, slides can be considered as time saving for both instructors and students. Slides allow students to take notes more easily during lectures (Fritschi, 2008; Susskind, 2005, 2008). Providing slides for students to view prior to classes may facilitate learning, as it lowers the burden of notetaking during class that may lead to students missing out on important information (Wecker, 2012).

Criticisms of PowerPoint

Learning theories suggest that PowerPoint may also constitute a danger for learning in addition to its benefits. For example, according to cognitive theories of learning, effective learning occurs if limited cognitive resources

are used in an optimal manner (Paas & Sweller, 2014). However, when PowerPoint slides present too much information to handle, this limited capacity may be exceeded and "PowerPoint overload" occurs. This is, for instance, the case when the PowerPoint slides include "busy backgrounds, endless bullet points, and a tangle of diagrams clearly shutdown understanding, instead of opening it up" (Atkinson & Mayer, 2004, p. 1). More specifically, the modality principle of the CTML (Mayer, 2009) may be violated, when the screen involves too much on-screen text as the presentation instead of reliance on the spoken word of the presenter or narrator. Redundancy may also occur if the instructor simply reads out the screen content verbatim, which is very common in PowerPoint practices (Hill et al., 2012; Yilmazel-Sahin, 2009). In addition, the segmenting principle may be violated when slides containing too much information are not broken down into smaller units. Coherence principle may also be violated if irrelevant content exists within a presentation. Multimedia principle could be violated if on-screen text does not have corresponding graphics (Atkinson & Mayer, 2004). Moreover, the contiguity principle may be violated if visuals and text (spoken and on-screen) are presented consecutively rather than simultaneously. Finally, signaling principle may be violated when the essential materials are not highlighted by the presenter (Mayer, 2009).

The use of PowerPoint slides in classes may pose an important threat to learning, as students may miss out on the more significant content of a lesson at the expense of the less significant. For example, when the instructor presents a slide, an interesting visual may capture the learners' attention and this results in the visual being focused on more than the important oral information (Levasseur & Sawyer, 2006).

As most studies reports, PowerPoint encourages a classroom climate, where the teacher is seen as the primary knowledge source. That is, PowerPoint encourages more of a teacher-centered and less of a student-centered approach (Hopper & Waugh, 2014). This situation can be especially critical and detrimental for certain disciplines where active participation, engagement, and critical pedagogy are required (Hill et al., 2012). PowerPoint is believed to hinder spontaneous classroom discussion and discovery, and instead encourages presenters to simply read the slide content to the class verbatim. On the other hand, some believe that although it is true in most circumstances, it is more of an instructor's deficiency than a flaw of PowerPoint itself (Hopper & Waugh, 2014). The problem of learner passivity also exists in teacher education. The research indicates that despite teacher educators' belief that critical pedagogy should be adopted instead of passivity, they do not always demonstrate this in their own teaching practices; such as lecturing directly from PowerPoint slides (Yilmazel-Sahin, 2009).

Another criticism aimed at PowerPoint is that it can promote an oversimplification of certain content. Although, simplification or abbreviation can be an effective means of information presentation, when over-simplification or abbreviation through bullet pointing is excessive, critical thinking becomes discouraged. In cases of extreme abbreviation, important content and its interconnections, complexity or breadth may be lost on the learners (Hill et al., 2012; Hopper & Waugh, 2014). "The PowerPoint style routinely disrupts, dominates, and trivializes content" (Tufte, 2003, p. 2). Sometimes course content, which is supposed to be covered elaborately and critically, can be inappropriate to transfer into solely the "bullet points" style so often attributed to PowerPoint; even instructors complain that they sometimes feel they have to remove some of the course contents (Craig & Amernic, 2006).

Cooper (2009, p. 133) reported that the worst PowerPoint presenter habits deserving of criticism, in the eyes of cognitive learning theorists, are the following:

- Too many or too few words per slide;
- Use of backgrounds that are inappropriate or irrelevant to the content;
- Too much animation, sound effects, or video;
- Too many slides for the presentation duration;
- Overcomplicated graphics or charts; and,
- Lack of presentation structure and content relationships.

PowerPoint in Education

In the literature, there have been plenty of studies conducted on the effectiveness of PowerPoint, but no consensus of the results. For example, with regard to learning, studies have shown that PowerPoint results in better, less, or no significant learning compared to the traditional whiteboard style of teaching. Considering the beneficial effects of PowerPoint, Nowaczyk, Santos, and Patton (1998) conducted a study in a university context that demonstrated a positive relationship between the perceived effectiveness of PowerPoint and course

achievement. In the same manner, Erdemir (2011) demonstrated that PowerPoint assisted instruction led to higher achievement in Physics lectures than the traditional whiteboard approach. In a more recent study, it was found that students' perceived learning scores to be significantly associated with instructors' usage of PowerPoint (Dean, Lee-Post, & Hapke, 2017).

Studies have also shown the negative effects of PowerPoint on learning. For example, Amare (2006) conducted a study with technical writing students who received instruction based on PowerPoint presentations and those who received the traditional lecture format. It was found that although most students preferred lectures with PowerPoint, the learning performances were better for the students who received traditional lectures. Similarly, El Khoury and Mattar (2012) demonstrated that traditional lectures led to more learning than using PowerPoint presentations. In another study, Wecker (2012) found that slides act as speech suppressors due to the dysfunctional allocation of attention. In a more recent study, medical students were randomly assigned into whiteboard and PowerPoint groups and were then taught the same topic. The study's results showed the whiteboard group exhibited superior learning. Additionally, the majority of the students preferred whiteboard lectures over PowerPoint presentation method of instruction (Bamne & Bamne, 2016).

Some studies found no significant effect of the use of PowerPoint on learning. For instance, Apperson, Laws, and Scepansky (2006) found that although PowerPoint contributed positively to a variety of factors (e.g., structure of the lesson, learning interest, and instructor likeability), achievement was not significantly affected by using PowerPoint. Conducted in a non-classroom field setting, Buchko, Buchko, and Meyer (2012) found that the use of PowerPoint did not have any significant effect on participants' recall of religious sermons. In a more recent study, it was put forth that PowerPoint did not result in greater performance among students compared to those who received traditional instruction (Chou, Chang, & Lu, 2015).

Studies also investigated students' perception of using PowerPoint in the classroom. Most studies found that students preferred PowerPoint-enhanced lectures over pure lecture format (Craig & Amernic, 2006; Levasseur & Sawyer, 2006). This is because students were found to believe that the use of PowerPoint contributes positively to the attitude towards lectures (Nowaczyk et al., 1998; Susskind, 2005, 2008) and classes with PowerPoint were perceived to be more interesting and entertaining (Apperson et al., 2006). Research has also shown that lectures with PowerPoint increases student self-efficacy (Susskind, 2005, 2008). Students believed that PowerPoint made it easier for them to understand course content (Hill et al., 2012; Nowaczyk et al., 1998). Additionally, lectures delivered via PowerPoint were perceived to be more organized, as slides present the key information, placing emphasis on the most important information by summarizing and simplifying the content (Baker, Goodboy, Bowman, & Wright, 2018). Students believe that PowerPoint helps in notetaking during classes (Fritschi, 2008; Susskind, 2005, 2008). PowerPoint slides may also function as course notes for students to study for their exams, although its effect on students' course attendance and performance is mixed (see Worthington & Levasseur, 2015).

However, many of the arguments about PowerPoint are based on anecdotal and speculative studies (Hopper & Waugh, 2014; Kosslyn et al., 2012; Moulton et al., 2017; Savoy et al., 2009). When the literature is examined, it can be seen that the majority of studies about PowerPoint effectiveness adopted media comparison research; comparing lessons that were enhanced with PowerPoint to lessons that adopted the traditional whiteboard lecture approach. However, these studies have certain methodological flaws (Moulton et al., 2017). The question may not be related to whether or not PowerPoint should be used in the classroom, but in how to use it effectively (Jordan & Papp, 2014). In order to gain insight with respect to how instructors use PowerPoint in the classroom, students' perceptions may be analyzed in depth. However, only a few studies have been conducted on this topic (Abdelrahman et al., 2013; Hill et al., 2012; Yilmazel-Sahin, 2009). Examining this issue in the teacher education context may be considered critical, as teacher educators are regarded as the role models for preservice teachers. Their good or weak PowerPoint practices may therefore affect preservice teachers' future teaching practices (Abdelrahman et al., 2013; Polly & Binns, 2018; Savasci Acikalin, 2011; Yilmazel-Sahin, 2009). In light of these issues, the purpose of the current research is to explore preservice teachers' opinions about their instructors' PowerPoint practices and their perceived effect on learning. To this end, the following research questions are posed:

1. What are preservice teachers' opinions about the design and content of PowerPoint slides prepared by their instructors?
2. What are the perceived effects of using PowerPoint in the classes?

Method

This part provides details about the research methodology applied in the current study; the research design, the study's participants, data collection instrument and procedure, and also the method of data analysis conducted.

Research Design

This qualitative study is a type of case study defined by Stake (2000) as "one of the most common ways to do qualitative inquiry" (p. 435), and involves deep understanding and description of the phenomenon or issue to be examined in a study (Creswell, 2007). It is an in-depth study and provides comprehensive understanding of the case under study. More specifically, this is a descriptive case study that aims to describe preservice teachers' points of view about their instructors' use of PowerPoint slides within their classes.

Participants

The participants were selected with convenience sampling method based on the criteria of being available, having volunteered to join the study, and easily accessible to the researchers (Creswell, 2012). Each participant was asked about their experience with PowerPoint slides. All of them stated that they already had experience and were familiar with PowerPoint. A total of 10 preservice teachers (four females, six males) who were studying for a bachelor's degree at a public university in Turkey were selected. All of them were being educated at the same university in the Anatolian region of Turkey. Demographic information about the participants is presented in Table 1.

Table 1. Demographic Information of the Participants

Variable		Frequency	Percentage
Gender			
	Female	4	40
	Male	6	60
Grade Level			
	Sophomore	3	30
	Junior	2	20
	Senior	5	50
Age (years)			
	19	1	10
	20	1	10
	21	1	10
	22	4	40
	23	1	10
	24	1	10
	29	1	10
Discipline			
	Computer Education and Instructional Technology	6	60
	Psychological Counseling and Guidance	3	30
	Primary School Teaching	1	10
Total		10	100

As can be seen in Table 1, their discipline areas varied; with preschool teachers from Computer Education and Instructional Technology (n = 6), Physiological Counseling and Guidance (n = 3), and Primary School Teaching (n = 1) departments. Although from different disciplines, all were from the Faculty of Education, and studying at different levels of their respective bachelor's degree program. Most of them were senior students (n = 5), followed by sophomore students (n = 3), and then junior students (n = 2). Finally, their ages ranged from 19 to 29 years old, with most aged 22 years old.

Data Collection Instruments and the Procedure

The study collected pure qualitative data through a self-developed interview protocol. The interview protocol included seven main questions that were prepared by the two researchers of the study, based on the literature. The interview protocol was designed according to the semi-structured approach. When the interview questions were finalized, the data collection process commenced.

A total of 10 interviews were conducted with the participant preservice teachers. In qualitative research, sampling continues until the data reaches a point of saturation (Glaser & Strauss, 2017; Guest, Bunce, & Johnson, 2006; Morse, 2015; Seale, 1999). This is the point where no "new" data is being revealed, repetition of the data has started and therefore saturation has been reached. At this point, no further interviews are conducted with other participants. The data collection process was completed in a period of two weeks during the 2017-2018 spring semester. The duration of the interviews ranged between eight and 15 minutes. The interviews were conducted singularly and audio recorded after receiving the necessary permission from each of the interviewees. Information pertaining to the participants' identity remained confidential. The participants were treated according to the participating universities' rules on ethical means of research.

Data Analysis

The interviews were first transcribed verbatim, and then analyzed according to the inductive content analysis method using QDA Miner Lite software. The analysis was conducted by the two researchers, together discussing and reaching a consensus about the themes and codes generated. Rather than acting separately, the simultaneous data analysis conducted by the two researchers helped to eliminate disagreement, and indeed enhanced agreement on generating the themes and codes. Hence, any concerns over researcher bias which may have affected the analysis process was assuaged, and consequently the validity of the results were assured. The reliability and validity of the findings were provided with a level of credibility through this approach. The qualitative data helped to provide a deep and meaningful understanding of the issue being studied.

Results

A total of two themes and 12 codes were generated in accordance with the research questions. The coding scheme is presented as Figure 1.

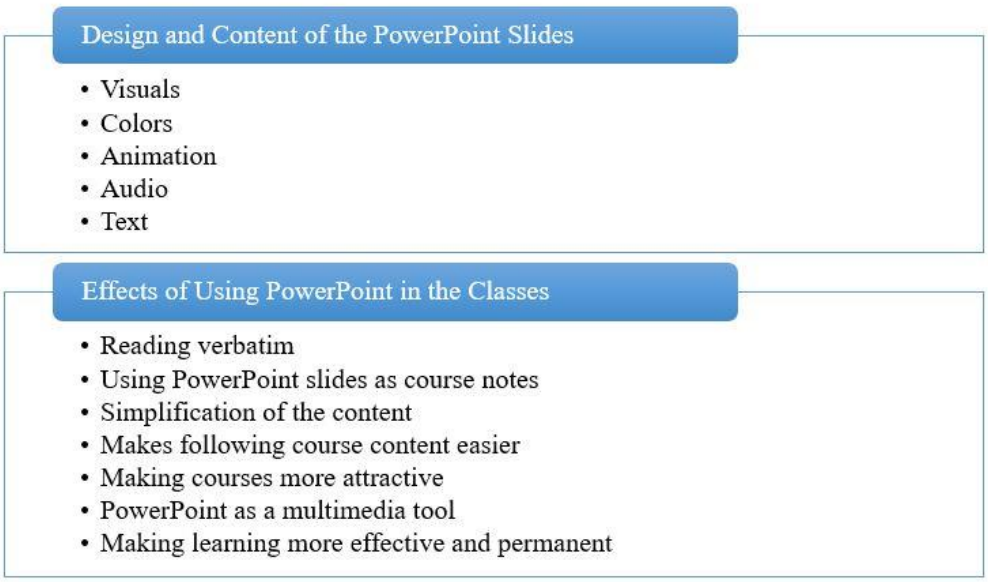

Figure 1. Coding scheme

Two main themes, 12 codes and 16 sub-codes were generated during the analysis process (see Table 2). These were used to answer the two research questions that were examined in this study and which have been explained individually in the following subsections.

Table 2. Summary of the Findings

Themes	Codes	Frequency	Occurrence
Design and content of PowerPoint slides	Visuals		
	• Positive	9	18
	• Negative	3	5
	Colors		
	• Positive	2	3
	• Negative	5	9
	Animation		
	• Negative	2	3
	Audio		
	• Negative	1	1
	Text		
	• Positive	2	2
	• Negative	10	33
Effects of using PowerPoint in the classes	Reading verbatim		
	• Disadvantage	9	12
	Using PowerPoint slides as course notes		
	• Advantage	8	11
	Simplification of the content		
	• Positive	8	17
	• Negative	3	3
	Makes following course content easier		
	• Advantage	5	9
	Making courses more attractive		
	• Advantage	4	5
	PowerPoint as a multimedia tool		
	• Advantage	8	12
	Making learning more effective and permanent		
	• Advantage	5	8

Table 2 presents the themes, codes and sub-codes generated from the data. The results are presented in the descriptive manner; namely, the frequency that refers to the number of cases, and occurrence that refers to repetition of the codes. The results are explained in detail in accordance with the two research questions as follows.

Preservice Teachers' Opinions about the Design and Content of PowerPoint Slides

In regard to first research question, the preservice teachers' insights about the design and content of the PowerPoint slides prepared by their instructors were explored. A summary of the findings is presented in Table 2. In relation to the first research question, a theme named "Design and Content of PowerPoint Slides" yielded five main codes; namely visuals, colors, animation, audio, and text. First, all of the preservice teachers mentioned text inefficiency in PowerPoint slides. For instance, one preservice teacher declared:

> When the slides include too long/much text, then these slides become complex and confusing for us, and learning becomes more difficult as a result. [PT7]

Similarly, another interviewee stated that:

> Long texts do not capture our attention naturally, and there is no fluency in those circumstances...Using too long/much text in the slides is not a good way, it is absolutely incorrect use...Sometimes any part of the topic which can be explained only in three sentences, is explained in six sentences in the slides. Hence, we do not understand the long sentences… [PT6]

Whereas, only two of the participants stated the correct and efficient usage of text. One of them stated that:

> When the font size used in the slides is small, I like it and it draws my attention. [PT10]

Another of the preservice teachers declared that:

> Some font types capture our attention, like certain handwriting styles or the Times New Roman or Arial font types etc. Also, when the font size is set carefully the text can be easily read; I want to listen to that course and presentation much more. I like slides prepared in that way. [PT10]

After the text issue of the slides, almost all of the preservice teachers (n = 9) stated their favor of visuals being included in the PowerPoint slides; whereas, three of them stated the opposite. Some statements from the interviewees favored visuals in the slides, as in the following examples:

> I like and prefer slides in which visuals, images, and graphs are used. [PT7]

> Instead of text, visuals such as images, photographs, or comics capture my attention much more. [PT1]

> When visual materials are used, then learning becomes more permanent. When visual materials are included in the slides, maybe even videos…then those slides become more attractive and entertaining… [PT10]

On the contrary, three of the participants complained about the visual aids used in PowerPoint slides prepared by their instructors. For instance, one of them said:

> Sometimes they [instructors] use unnecessary visual aids, or too many visual aids; and too many visual aids do not serve their purpose. [PT3]

Colors used in slides was another issue revealed in this study. Half of the preservice teachers (n = 5) complained about the colors of the PowerPoint slides. For example, one of them stated that:

> The selection of the colors used in the slides, such as text having been written in red, or blue colors on a black background bores us, strains our eyes, and bothers us. [PT10]

On the other hand, two of the preservice teachers favored certain colors being used; for instance, one said the following on this issue:

> I think transverse colors or colors which are coherent are of importance such as black colored text written on a white background makes for easier reading as it is clearer, which makes the slides better. [PT7]

Finally, in terms of the design and content of the slides, two of the interviewees complained about the use of animation, in addition to one participant's negativity about audio used in slides; declaring that these distracted their attention.

Effects of Using PowerPoint during Classes on Preservice Teachers

The second theme, which concerns the second research question, studied the effects of using PowerPoint in the classroom on preservice teachers and their learning.

The highest percentage belonged to simplification of the content, followed by reading verbatim, PowerPoint as a multimedia tool, then using PowerPoint slides as course notes. At a lesser ratio were the codes of; makes following course content easier, making learning more effective and permanent, and finally making courses more attractive. When looking at the numbers of occurrence, the highest number again was for simplification of the contents. According to the findings retrieved from the 10 interviewees' data, eight of them mentioned simplification of the content as an advantage of PowerPoint slides, whereas three interviewees thought the opposite. The following are some sample statements of the preservice teachers who favored the PowerPoint slides due to their providing simplification of the content.

> Yes, I use the slides and can take notes; also keywords and main phrases used in the slides make it easier to remember the topic and are enough and effective for me. I can remember them while in the exam, and I can find the answer by remembering the main topics, keywords etc. from the slides, and then answer the question and write a full paragraph... Rather than referring to full texts or books, and

> reading from these resources, the PowerPoint slides summarize the topics covered in the class and make learning easier for us. I think this is the main function of the slides. [PT2]

> As an advantage of the slides, they present the topics succinctly, and we can think of PowerPoint slides as a brochure, as they summarize the topics covered in the classes. [PT8]

On the other hand, as previously stated, three interviewees had opposing ideas. For instance, one of them said:

> Topics are not understood completely from the slides, since they cover only a topic's main points. [PT4]

The second and highest rated code under the theme –the effects of using PowerPoint in classrooms on preservice teachers– was reading verbatim. Almost all (n = 9) of the participants mentioned this issue. They frequently complained about their instructors' reading slides out loud word-by-word. As an example, some of the interviewees stated that:

> In fact, some instructors sit on their chair and directly read what is written on the slides, and finish their instruction by just reading directly. [PT3]

> There are some instructors who completely stick to the slides, and they do nothing else, e.g., they do not make eye contact with the students. Or, some will say to the students to study from the slides which they prepared, but offer no other materials or teaching activities. [PT2]

> When teachers stick to the text written on the slides during classes, we get bored and it bothers us. Some instructors explain to us that this is not the correct use of PowerPoint and other slides… However, still some instructors just do it that way. Rather than reading a book, they just read from the slides, just as they are. Then, no difference exists between the two, and the students in the class are troubled. [PT9]

Another code under the theme was using PowerPoint slides as course notes. Of the 10 preservice teachers, eight mentioned this issue as an advantages. Two examples of the preservice teachers' comments follow about the positive effect on their learning when using PowerPoint slides as course notes:

> After the class, we talk about the slides with our classmates... The slides are beneficial for both us as students and the instructors too, and both in-class and out-of-school activities including interaction, communication, and learning. [PT1]

> The slides offer us some benefits, and one of them is using slides as course notes. We take the slides from our instructors and with note-taking; we then use them to study for our courses if we have no course books... It's a positive effect that can be seen in our exam results... We now prefer slides to course books... [PT6]

The other generated code was PowerPoint as a multimedia tool, which was expressed by eight of the preservice teachers. On this issue, the following statements were made by the participants:

> I like slides which include SmartArt, drawings, videos, external audio files, audio recordings, animations, or comics etc., and some themes like in Prezi. Slides can provide us with all these different types of files embedded... [PT9]

> You can show more than one thing at one time in slides like images, WordArt, concept maps, coding or grouping etc., then it is seen as much better for us. [PT4]

With regards to the effects of using PowerPoint in classrooms on preservice teachers, the codes generated from the qualitative data in this study are following course content easier (n = 5), making learning more effective and permanent (n = 5), and making courses more attractive (n = 4).

Discussion and Conclusion

Presentation applications have become an indispensable part of our personal and professional lives, including various types of learning environment (Kosslyn et al., 2012; Moulton et al., 2017). There are many tools available for this purpose; however; PowerPoint is clearly the most frequently used (Garner et al., 2009; Hopper & Waugh, 2014), with one report declaring that 30 million PowerPoint presentations are made each day; that's 1.25 million every hour (Mahin, 2004, as cited in Hill et al., 2012). PowerPoint has become a ubiquitous form of media that has come to dominate learning settings (Hopper & Waugh, 2014).

PowerPoint with its features offers many benefits, plus certain drawbacks at the same time which have attracted some level of criticism (Hill et al., 2012; Hopper & Waugh, 2014). Hence, in order to gain a deeper understanding of PowerPoint slides and their efficiency in the classroom, more research is required, since many studies conducted have focused solely on anecdotal and speculative studies (Hopper & Waugh, 2014; Kosslyn et al., 2012; Moulton et al., 2017; Savoy et al., 2009). However, only a few research studies have been conducted on preservice teachers' perceptions and opinions about their instructors' use of PowerPoint slides in lectures (Yilmazel-Sahin, 2009). For this purpose, the current study aimed to explore preservice teachers' perspectives and opinions about their instructors' use of PowerPoint slides in the classroom in order to gain a deeper understanding and to guide instructors in their continued and future use of this teaching aid.

The study's findings indicated that all of the preservice teachers interviewed criticized text inefficiency; specifically text length on PowerPoint slides prepared and used by their instructors, and as also reported in Cooper's study (2009). This issue has already been critically addressed in the literature, that including too much on-screen text in slides leads to redundancy and violation of the modality principle of CTML (Hill et al., 2012; Yilmazel-Sahin, 2009). Moreover, the segmenting principle of CTML could also be violated in these circumstances due to the use of too much on-screen text in place of dividing between smaller and more meaningful parts (Atkinson & Mayer, 2004). Instructors should take care with regards to this issue in order not to distract their students during classes by presenting too much text on the slides. Instructors need to remember the difference between an article, a course book, and presentation slides; and accordingly not include too much text when creating presentation slides. They should try as much as possible to convert text into meaningful and smaller parts, and then present their content with added multimedia, like visualizing. This study also yielded the importance of visuals, since the interviews indicated that the preservice teachers frequently favored visuals used in slides. When hypermedia like graphics, images, and sounds are used, the instructional message delivered increases, which can subsequently lead to an improvement in learning as it delivers more than one set of information at a time, as Mayer (2009) declared, and provides an alternative delivery mechanism for information through the extended utilization of PowerPoint slides (Savoy et al., 2009).

On the other hand, the current study also revealed that few participants complained about the inclusion of too much animation, audio or video within presentation slides. Similar with the results of the current study, Cooper (2009) also criticized slides having too much animation, audio or video files from the perspective of cognitive learning theory. Yilmazel-Sahin (2009) also found that students complained about excessive exposure to information. Additionally, Fritschi (2008) reported that students found disproportionate levels of material content interfered with their learning. For this reason, instructors should be careful when incorporating multimedia features during the preparation of slides for presentations to their classes.

The current study's findings also revealed the effects of using PowerPoint slides in classes from the perspective of preservice teachers as learners. As advantages; the preservice teachers highlighted issues using PowerPoint slides as course notes, using PowerPoint as a multimedia tool, and the oversimplification of course content.

Considering the use of PowerPoint slides as course notes, a variety of studies have previously demonstrated that PowerPoint slides can function as course notes for students to prepare for their exams (Apperson et al., 2008; Levasseur & Sawyer, 2006; Susskind, 2005). In the current study, the preservice teachers also reported positively about PowerPoint's functionality as lecture materials. On the other hand, providing slides to students may also negatively affect their course attendance and exam scores, although the literature does not arrive at a consensus on this issue (see Worthington & Levasseur, 2015). Nevertheless, instructors should consider this threat in their consideration of providing slides to students for the purpose of being utilized as course notes.

The reported beneficial effect of PowerPoint functioning as multimedia is not surprising, considering the fact that PowerPoint is of course a form of multimedia in itself. It is evident from multimedia research that when text is enhanced with pictures, learning is also enhanced as a result (Mayer, 2009). On the other hand, using more than one media does not always guarantee improved learning. Instructors should apply evidence based on the

principles of multimedia when designing presentation slides. Significantly, improper usage of PowerPoint may in fact be detrimental to learning (Mayer, 2009).

Regarding the positive effects of PowerPoint utilization, simplification of course contents was discussed but no consensus was reached. In the current study, the preservice teachers frequently favored slides due to their having simplified the course content; however, some criticism was mentioned in that slides can cause oversimplification of the content due to excessive abbreviation and through bullet-pointing, which can lead to learning deficiencies. Oversimplification of course content in presentation slides has already been reported in the literature. Craig and Amernic (2006) indicated that course topics are not always appropriate to be presented as bullet points on PowerPoint slides. Instructors may feel a sense of urgency to remove too much content from their slides, but this can result in some important aspects of the content not being adequately covered. Trivialization of course content as a routine of PowerPoint slide preparation (Tufte, 2003), loss of necessary complexity, and discouraging critical thinking (Hill et al., 2012; Hopper & Waugh, 2014) are all potential negative effects from the oversimplification of content in PowerPoint presentations. Therefore, in order not to degrade learning outcomes, one of the most important issues that should be taken into consideration by instructors when preparing their presentation slides for classes is to exercise extreme care in terms of simplifying course content.

Reading verbatim was highlighted by most preservice teachers in the current study as a significant negative effect of PowerPoint presentations. Just reading the text from a slide out loud word by word results in the instructor becoming passive during their lecturing, and thereby hinders spontaneous classroom discussions and interaction. In addition, it may cause dysfunctional allocation of attention (Wecker, 2012), lack of eye contact (Hartnett, Römcke, & Yap, 2003), and increased passivity etc. (Craig & Amernic, 2006; Pauw, 2002). This approach by instructors to presenting slides guides preservice teachers inappropriately and may be considered a negative modeling example for their training as future educators themselves (Yilmazel-Sahin, 2009). The improper use of slides by instructors and their deficiency as a teaching practice (Hopper & Waugh, 2014) is significant to an instructor's teaching style and behavior, as well as their teaching methods and strategies during lectures. It should be noted that courses should be designed interactively in order to facilitate active learning and critical thinking.

To summarize, from the preservice teachers' perspective, PowerPoint slides prepared and used by instructors in their classes have both advantages and shortcomings. Similarly, the design and content of PowerPoint slides presented diverse insights. In order to gain considerably more benefit from PowerPoint slides during teaching, instructors should take note of the issues revealed and highlighted in this study. Since instructors are the natural guides and role models for preservice teachers, in addition to focusing on learning outcomes, instructors should be careful not to negatively affect future teachers during their training (Polly & Binns, 2018). As a concluding remark, it should be noted that inefficiency of PowerPoint slides can result from their improper usage by instructors, based on a lack of basic technical skills in using the software, or a lack of information on how to prepare effective course materials embedded with multimedia etc.

A few limitations exist within the current study. First, although qualitative research may provide a better and deeper understanding of the issue being examined, the current study may be limited with regard to generalization of the findings to a wider population to the same degree of certainty as with quantitative studies. Other limitations may be related to having reached inconsistent conclusions (Barbour, 2001), whilst another issue may be the limited duration of the interviews, which were relatively short at between eight and 15 minutes each. Finally, as with almost all qualitative studies, their uniqueness makes them difficult to replicate.

Further research could focus on different disciplines and access an increased number of participants in order to strengthen the generalization of the results to a wider population. Conducting similar research with preservice teachers within a longitudinal research, such as while being educated in the first year of their program, at the mid-point, and again in their final year, and then making a comparison among their perspectives on being exposed to PowerPoint slides on a gradually increasing scale, could provide better and deeper understanding, and may also reveal different and more insight as to the issues in this area.

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