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College students' preferences of instructional material formats

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Abstract: This study explored students' preferences based on their learning styles regarding instructional formats. Thirty eight students enrolled in a blended graduate course offered in the United Arab Emirates participated. The researchers created different instructional formats to provide students with opportunities to choose their preferred formats. Data collection included a questionnaire and statistics generated by the learning management system. The data collected revealed some inconsistencies between the students' stated preferences and the ways in which they accessed some of the material. It appears that the students' preferred learning styles match the formats they used. When students accessed assignment guidelines online their choice of text and an alternative format was almost the same. This study furthers the discussions on student preferences regarding instructional formats and their learning style, especially in the Gulf region where few studies of this nature have been conducted.

Keywords: Content format; blended learning; learning styles; student preferences.

INTRODUCTION

It is acknowledged that not all invidividuals learn in the same way [1] and that the consideration of learning styles can assist students to learn more effectively [2]. Students often have specific preferences in the way they obtain and process information presented to them [3]. Therefore, it makes sense for instructional procedures to accommodate students' individual learning preferences in order to enable them to achieve learning outcomes more efficiently.

As observed by Snowball [4], blended learning environments have the potential to offer a variety of instructional materials and activities that can accommodate student preferences in a way that would not be possible with more traditional formats. Studies conducted on students' perceptions of blended learning and their learning styles suggested mixed results [4, 5]. For example, Akkoyunlu and Soylu [5] found that students' opinion on blended learning differed according to their learning style. More research is needed to investigate how individual differences can be accommodated in such environments [1]. With this in mind, we explored students' perceptions of their preferred instructional formats based on their learning styles in a blended learning graduate course offered in the United Arab Emirates in the academic year of 2014-2015. To achieve the study goal, the researchers created and made available different instructional materials. This research endeavors to advance greater understanding of the design of content formats to meet students' preferences.

Background Literature

Akbulut and Cardak [6] consider the provision of similar instructional materials to all students to be pedagogically ineffective. In order to achieve learning outcomes, the authors suggested gearing pedagogical procedures to comply with the students' individual needs. However, tailoring learning experiences to students' needs involves considering several factors including, for instance, background knowledge, ability, prior knowledge, motivation and learning styles [7]. Among these factors, learning styles have had substantial influence in educational practices [6] and both instructors and researchers have realized their importance [5].

Although there are different interpretations of the concept of learning style [8, 9], educators and theorists generally agree that students learn in different ways. Theorists like Kemp, Morrison and Ross [10] define learning styles as student's unique learning preference that can inform instructors to plan the learning and teaching environment. Kolb [9] defines learning style as the method preferred by an individual when processing and conceptualizing information. Some students, for instance, may prefer to focus on

facts, data and algorithms while others respond better to verbal or visual forms of information [11]. Furthermore, numerous models and frameworks have been proposed in the literature to describe the individual elements of learning styles [11, 9].

It has been argued that if instructional methods do not match with students' learning styles, it may create student discomfort and interfere with their learning [11, 8]. On the other hand, Felder [11] cautioned that teaching exclusively in students' preferred learning style may prevent them from developing the skills needed to function effectively both in school and as professionals. In this respect, Torre [1] suggested a balanced approach in which "all students are sometimes taught in a manner that matches their learning style preferences...and sometimes in the opposite manner, so they are forced to stretch and grow in directions they might be inclined to avoid if given the option." (166). Nevertheless, based on the argument that students learn differently, educators should accommodate instructional methods to individuals' preferences [7] whether these are delivered face-to-face or in technology-based formats [12].

In technology-based formats (such as PPT with voiceover or videos) researchers have investigated adaptive systems to provide students with content and materials to fit their learning preferences [6, 13]. Others have investigated students' perceptions of learning styles and the usefulness of different types of e-learning methods [14] as well as association between learning styles and methods of course delivery [15, 16]. Based on Kolb's model [9], Mohr et al. [14] reported variations in student perceived usefulness of e-learning formats. For example, students with a preference for concrete experience perceived interactive e-learning (synchronous and asynchronous interaction) more useful than those with a preference for abstract ideas. In contrast, findings revealed no association between non-interactive teacher-centered e-learning (e.g. audio, video) and student learning styles as conceptualized by Kolb. Despite the variations, the study outcomes may be useful to instructors in adjusting the selection of e-learning methods in order to benefit all students.

Further studies have explored students' perceptions of blended learning formats based on their learning styles [5, 1, 3]. Similar to Mohr *et al.* [14] findings, Torre [1] adopted the Index of Learning Style (ILS) inventory [11] and found variations in student perceptions of blended learning among active-reflective and visual-verbal students whereas sensing(facts)-intuitive(theories) and sequential(logical)-global(holistic) students did not differ significantly in their perceptions. Torre, for instance, observed that since sensing students prefer to learn using concrete materials, they found the course materials such as slideshows, web links and response system useful. In contrast, Uğur et al. [3] reported no significant differences on students' views on blended learning and its use when taking into account their learning styles. Qualitative results, however, suggested that students falling under the assimilator category as defined by Kolb showed more willingness to participate in the blended learning format than the other learning styles.

The studies cited above on different technology based formats seem to share a common objective which is to inform the design and delivery of instructional methods to accommodate students' learning style. In particular, Gonzales and Vodicka [17] emphasized the advantages of blended learning that facilitates learning by effectively combining "different modes of delivery, models of teaching and styles of learning..." (p. 8). For example, Snowball [4] found that the provision of a variety of learning activities in conjunction with traditional lectures were appreciated and used by students. Some variations however, were also reported in which about a fifth of the class would prefer to have fewer or no online activities. As noted by Snowball, these results indicated student differences in learning styles and a preference for offline activities.

Our study aimed to investigate students' perceptions of their preferred instructional formats based on their learning styles within a blended learning graduate course. As suggested by other researchers, investigations of student' perceptions of blended learning and learning styles is a relatively new area of inquiry, and more research is needed to inform the design and delivery of instructional methods [5, 1].

METHODOLOGY

The study sought to answer the following research questions:

1. Which means of representation do students prefer to support their learning and why?
2. Does the course topic influence the student's use of different means of representation?
3. Which means of representation do participants view/use more frequently and why?
4. What are students' preferred learning styles and do they match the materials used?

Setting

We conducted the study at a public teacher education institution located in the UAE in two sections of a 5 week graduate level course titled "Research Design and Methodology in Education." This was a required course in the Education Bachelor's Program offered in the spring of 2015. Students met with their faculty member three times per week for three hours per meeting. In addition, students had access to course materials 24/7 on the learning management system, Desire2Learn (D2L). All instruction was conducted in English. The content of the course was new to almost all of the students.

Students attended classes in which the instructor presented content using lectures, whole and small group discussion, individual work, hands-on practice and guest speakers. The instructor used PowerPoint while she talked about course content. Resources were created to be used so that students could access different means of representation which were posted on the D2L course site. The content was offered in D2L in .doc, PDF, PowerPoint (PPT), YouTube videos and PPT with voiceover. Assignment guidelines were also available on D2L in both .doc format and video. The purpose was to reach some of the students' different learning styles (auditory and visual). Kinesthetic materials were not provided because the course content did not lend itself to this kind of learning approach. For the visual learning style PDF, .doc and PPT materials were made available. PPT with voiceover and videos provided a combination of auditory and visual materials.

Content in D2L was organized by weekly topics. Students' research projects were presented at the end of the course. Students were allowed to select their own format (PPT, Video, Screencast, etc.) for delivering the oral presentation of their research proposal.

Participants

All enrolled students were invited to take part in the study and were informed that participation was voluntary. All of the participants were Arabic speakers, female and enrolled in a Master's Degree in Education program. Most participants were full time teachers. In the first week of the course, students completed an online survey to self-assess their learning style (http://www.2learn.org/learningstyles.html). A brief discussion took place to build awareness and insure that all students were conscious of their own learning styles.

There were 15 students in Section #1 and 23 in Section #2 for a total of 38 students. All students agreed to participate in the study.

Data Collection

Mixed methods of data collection were used to explore the research questions. A questionnaire containing a total of eleven questions six closed and five open-ended concerning students' preferred course content and assignment formats and learning styles was developed. On the last day of their course, all students (n=38) completed the questionnaire online using Google Docs. *Desire2Learn Insights* analytics software was used to determine students' access to various formats of course content and to compare students' self-report of use with actual use. This software is a "set of tools and comparative statistics for tracking, analyzing, and assessing student achievement over time and at multiple levels, including course, program, institution and system" [18].

Data Analysis

Descriptive statistics were used based on D2L analytics about access to the course content by students. Descriptive statistics of closed questions in the questionnaire were calculated. We compared use of alternative formats data with answers to the questionnaires in which students indicated their preferences. Content analysis for the open-ended questions of the questionnaire was performed using NVivo software.

Analysis of the questionnaire

A descriptive statistical analysis was performed on the closed questions. The questionnaire responses were collected from Google Docs. The Google Docs report was exported to an Excel spreadsheet and data analysis of the questionnaire responses and a review of the most frequent values for each of the answers were performed.

Student responses to the open-ended questions were uploaded to the NVivo qualitative software which helped to organize the responses. After reading the responses with no pre-defined codes, one of the researchers created a preliminary list of codes. Then, during the second reading across all responses of the students, the codes were refined by merging some of them, deleting others, and creating sub-codes. The researcher then assigned the responses under the respective code. Next, the information inside each code was read to find the main categories (e.g. reasons) and the respective codes were assigned to each main category. Student quotations were extracted to illustrate the findings within the main categories.

Data analysis from D2L

Desire2Learn Insigths software allowed us to count the number of times students accessed each one of the different course instructional materials (e.g. PDF, PPT, PPT with voice over) with the exception of the YouTube videos. However D2L data was available for the assignment guideline videos. The report produced by *Insights* was exported to an Excel file. We focused on data relating to the number of student accesses by file types for the assignment guidelines including to PowerPoint, PowerPoint with voiceover and .doc files on a weekly basis.

Limitations

This study is exploratory due to the small number of participants and the fact that they were all female.

English language proficiency of students in these courses varied. As a result, some students may not have completely understood the questionnaires and thus

their responses may not be accurately reflected. In addition, this study was conducted using two sections of one course taught by one instructor. This study could not include the analysis of student access to YouTube videos on D2L software; however data on video use was gathered for assignment guidelines and student responses on the questionnaire.

Ethical Considerations

Participation in the study was voluntary and all participating students signed a consent form. Use of alternative formats of course material and ability to use alternative formats for presentations were completely voluntary. These additional materials and allowances could enhance students' experience but they were not required. No personal information that allowed the identification of students was collected. The questionnaire was completed anonymously. Any student ID information from all the data collected from the D2L was not used.

RESULTS

Analysis of the questionnaire

A total of 38 students from the two sections answered the questionnaire. The first two questions were about the preferred formats for accessing the course content by students and the reasons for those preferences. Students were asked *Which format(s) did you prefer to use for accessing the weekly course content? Please rank by order of preference.* For each format the ranking choices were "most preferred", "preferred" and "least preferred". Within the most preferred format category, the students (Figure 1) chose first the PowerPoint with voiceover (with 20 responses) followed by YouTube videos (18 responses) and text (10 responses).

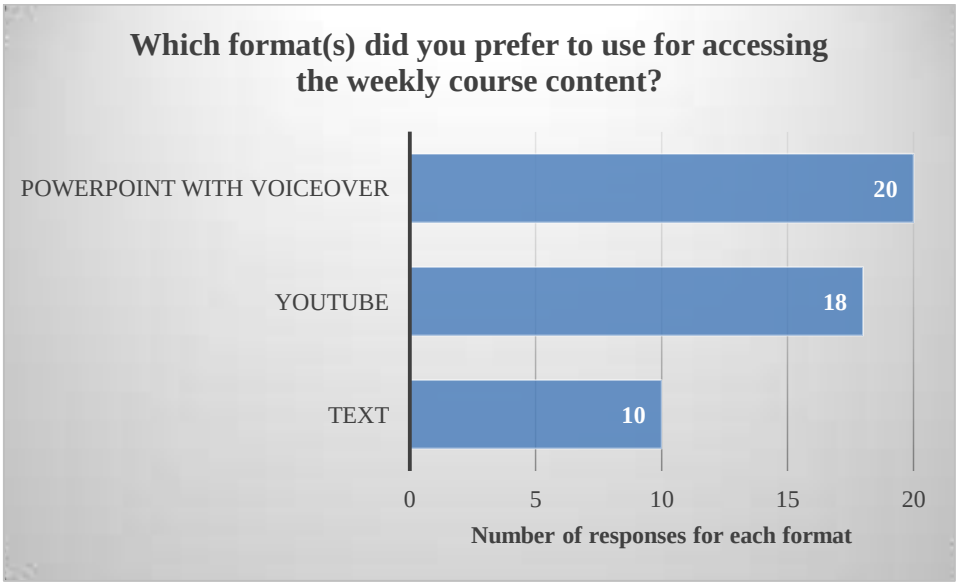

Fig-1: Number of times each format was preferred

An open-ended follow up question asked participants to "explain your choices indicated in the above Question 1". Four chose the videos because they made it easier to understand the course content. Three others selected the videos as they helped explain the content. One said, "…videos explain more the content compare[ed] with text." Other reasons included the videos gave more information, and delivered information easier compared to other formats. In addition, four students wrote different reasons for choosing text format. For example, one felt the text offered her more opportunities to understand the course content while another said it allowed her to read slowly and go back to re-read the information.

Four students noted that the PowerPoint (PPT) with voiceover facilitated reading and listening at the same time. Another indicated it highlighted important ideas and text. A further student noted that although the PPT was a good option, she preferred the option with "voice to explain." Two students suggested improvements to the PPT with voiceover including adding more information to the recording, and "explaining more than reading the slides." One student said the PPT included a summary of the content before class. She believed that in-depth knowledge of the content could then be developed through the readings. Another student felt that both the PPT and videos "made it easy to understand the content."

The third question in the questionnaire asked the students if the course topics had influenced them in the choice of formats when accessing the course content. Twenty eight students (74%) answered yes and 10 (26%) said no (Figure 2).

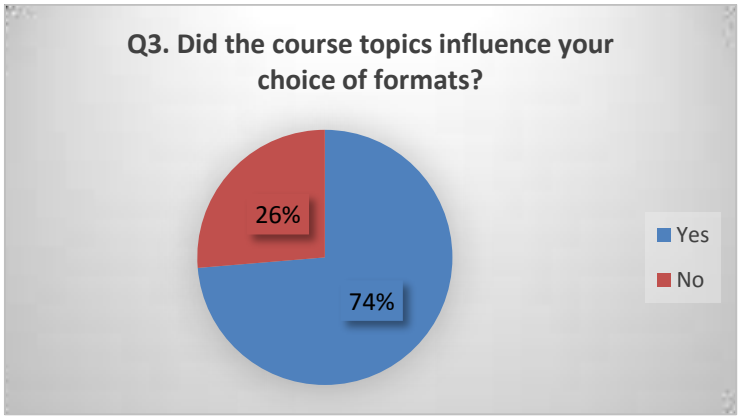

Fig-2: If the course topics influence of the students to access the course content

Question 4 asked students to explain their answers to question number 3. Five students suggested the course content was difficult. One stated, "It is [a] difficult subject; so with voice became simple." Two others indicated the formats available in the course made it easier to understand the content. A further student said that "most of course materials needed heavy explanations… I think YouTube videos were the most interesting and understood method." Since the course content was new, one student felt the various formats helped her understand the information. Two students explained they chose the format according to the quantitative and qualitative components. One said: "…for the quantitative research method, I personally used more videos, PPT…for qualitative research I used more written resources."

The fifth question asked students to use a 5 items Likert scale (*very helpful, somewhat helpful, made no difference, distracting, and not helpful at all*) to assess the degree of helpfulness of having some of the resources available in alternative formats. The students could choose more than one option in their answer. Most of the answers (26) included *very helpful*, while 10 found it *somewhat helpful* (Figure 3). One student said it *made no difference* while another consider it *distracting*.

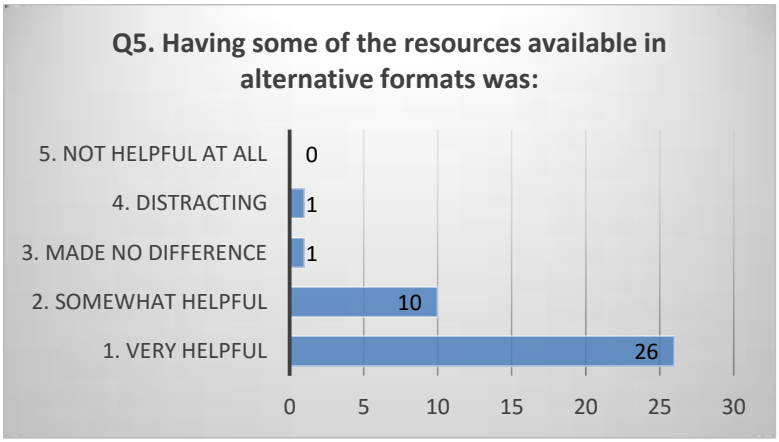

Fig-3: Degree of helpfulness of having some of the resources available in alternative formats

Question number 6 was an open-ended question that asked students about what other formats might have been helpful for presenting the course content. Five students indicated the available formats were sufficient for the course as illustrated by the following comment, "I Think these formats are more than enough and helpful to present the course content." Other suggestions included using worksheets, Smart Board, recording instructor's session and illustration diagrams such as SmartArt.

The next question also asked students to use a 5 items Likert scale (*very helpful, somewhat helpful, made no difference, distracting, and not helpful at all*) to assess student's perception of being able to listen to the assignments on D2L. Twenty one students (55.3%) said it was *very helpful*, while 13 (34.2%) said it was *somewhat helpful*. Two students said it *made no difference* and two others said it was *not helpful at all* (Figure 4).

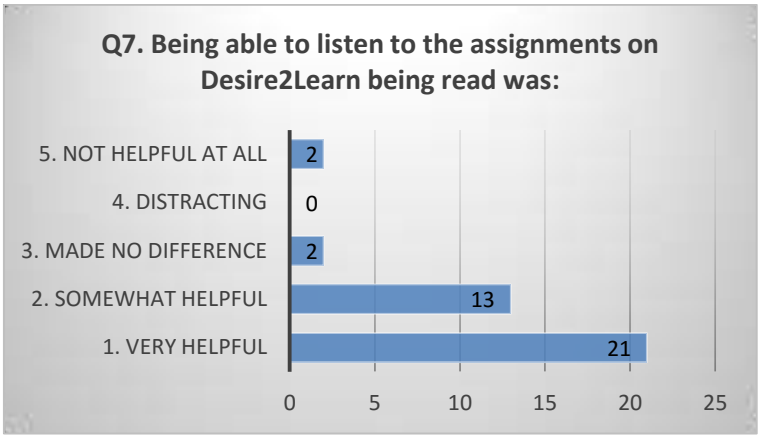

Fig-4: Perceptions of being able to listen to the assignments on Desire2Learn

Question number 8 was an open-ended question that asked what other formats might have been useful for the assignment instructions. Three students suggested using video to explain the instructions for the assignments, while another indicated PPT and video. Two others mentioned the PPT with voiceover not just be a reading of the content but should include explanations. For the current formats, four students did not differentiate if it was written or voice instruction, two suggested adding "examples during [the] explanation." The remaining two students wanted the same format "but with more explanation." Three students were happy with the available formats.

The students were assessed at the end of the course with an oral presentation of a research project. Question #9 which was open-ended asked the students which formats they preferred for presenting the final research project and the reasons for choosing it.

Twenty four students mentioned they preferred PPT to deliver the oral presentation of their research proposal. The remaining students did not respond to this question or their answer did not address the question. Among the 24 that did respond, six chose PPT because they were familiar with it, while four said it was easy to use. Four students suggested they could add multimedia to the PPT. One explained, "...because I can add text, pictures, videos easier to present information in a systematic way." Three students chose the PPT because they could add the topics to support their presentation as illustrated in the following quote, "adding notes on the slides always support me in case I forget one point." Other reasons include the PPT allowed her to "summarize the important information," it was easy to follow the information, and worked as a support for the presentation.

The instructor observed that all the students used PPT in their oral presentation of the research projects. Two of these 38 students also used printed posters in addition to using PPT.

Question number 10 asked students to use a 5 items Likert scale (not helpful, *distracting*, *made no difference*, *somewhat helpful* and *very helpful*) to assess their perception of being able to use any format to support their oral presentation. Twenty five students said it was *very helpful* and 10 other students said it was *somewhat helpful*. Two students answered it *made no difference* and one consider it *distracting* (Figure 5).

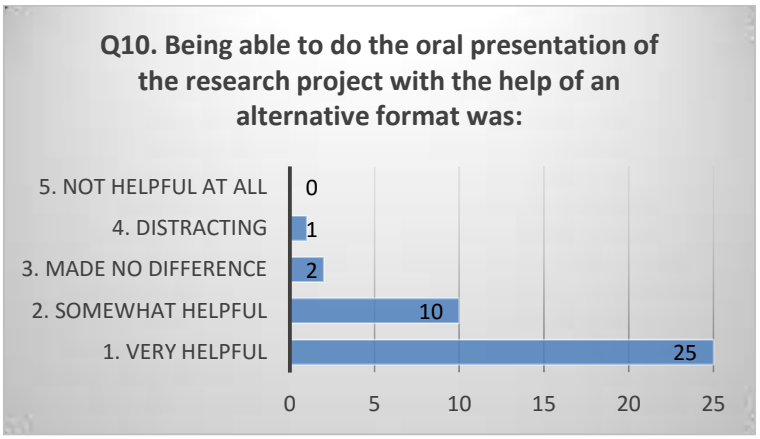

Fig-5: Perception of being able to use any format to support their oral presentation

The last question asked students what their preferred learning style was (they could choose more than one option). Visual learning got twenty eight responses while auditory learning got 11 responses, kinesthetic had 14 responses (Figure 6). Seven students answered they had two preferred learning styles while three said they preferred the three learning styles. The remained students said they only had one preferred learning style.

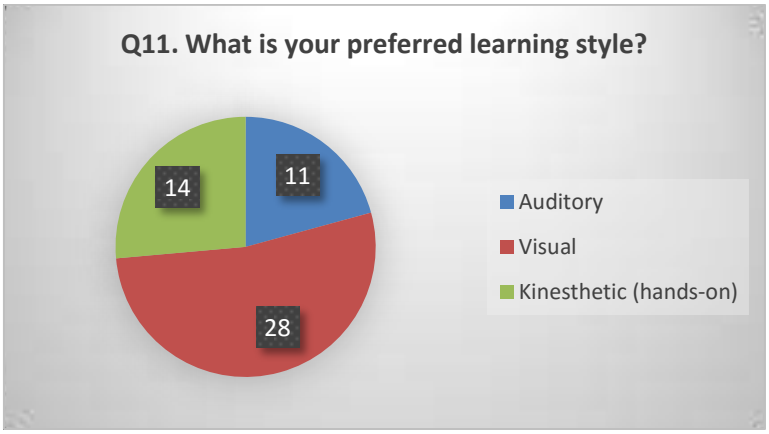

Fig-6: Students' preferred learning style

Analysis of course instructional material access on D2L

An analysis of the students' accesses on D2L to the different course formats was performed. The analysis included access to course content and access to assignment guidelines.

Content with PDF and .doc formats was the one with a larger number of accesses from the students followed by PPT with voiceover (Figure 7). Since there were 38 students, it is most likely that each student accessed content more than once. It was not possible to determine whether students accessed both or just one format. However, given that access for both formats was substantive, we assume that many students did access both with more students viewing text and pdf formats.

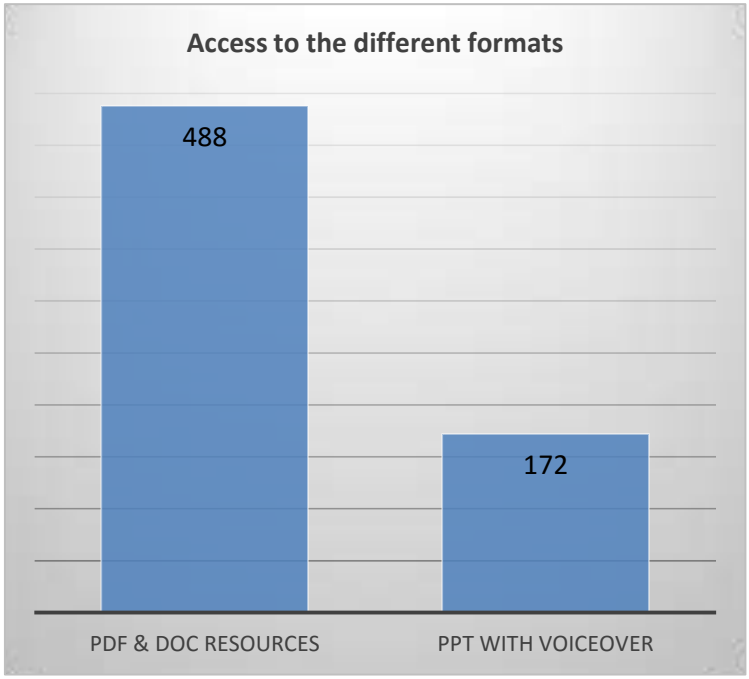

Fig-7: Access from students to different formats on D2L for content

Figure 8 shows that, overall, the access to PPT with voiceover decreased across the weeks while the access to PPT increased on weeks 2 and 3 and then dropped in week 5.

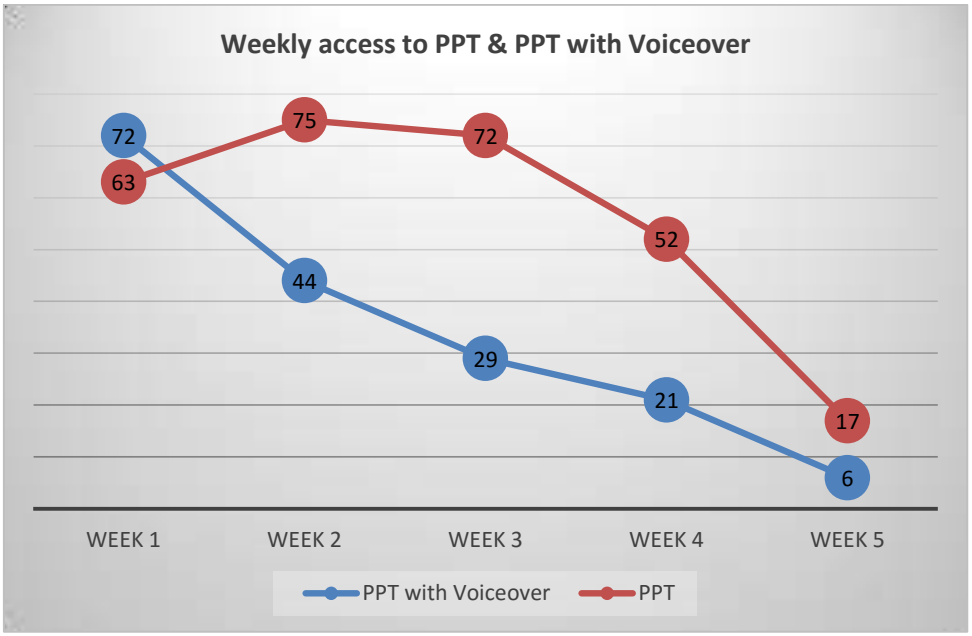

Fig-8: Evolution of the access from students to PPT with voiceover during the five weeks of the course

Regarding the three written guidelines for the assignments (Figure 9) the number of accesses on D2L from students decreased from 37 accesses in Assignment 1 to 34 on Assignment 2 and back to 37 on Assignment 3. Assignments 1 and 2 were completed by individual students. Assignment 3 was completed by pairs of students. The instructor provided an overview of the assignments but students were directed to use D2L for the specific guidelines. The instructor informally observed that some students printed the D2L assignments, made copies and then shared them with some of their classmates. The total number of students was 38 and Assignments 1 and 3 were accessed 37 times. D2L statistics did not provide information as to whether the same students accessed the same resources more than one time so it is not possible to say that the 37 accesses were done by 37 different students.

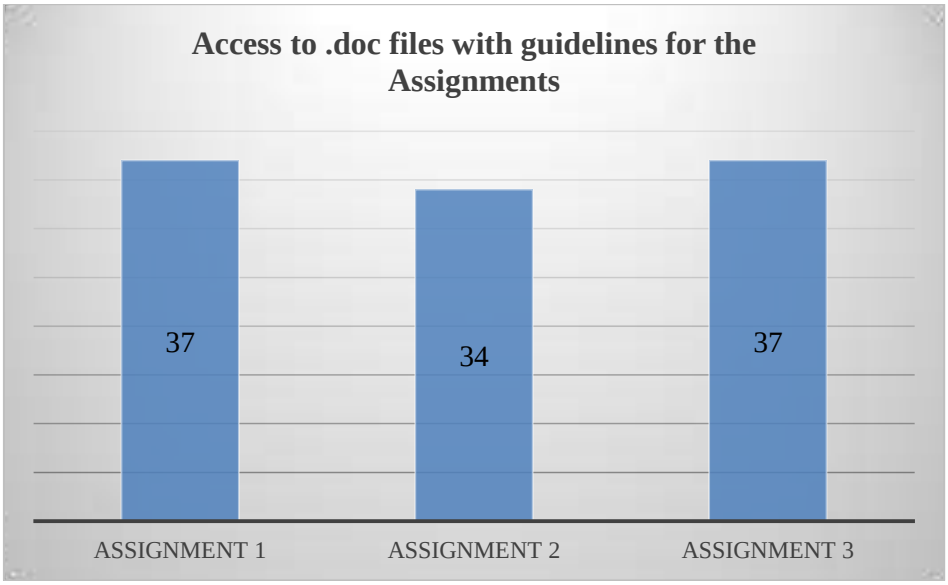

Fig-9: Access on D2L from students to the written guidelines of the assignments

The students could also choose to use videos to access the guidelines for the assignments (Figure 10). The video with guidelines for the first assignment had 35 accesses while the videos for assignments 2 and 3 had 30 accesses.

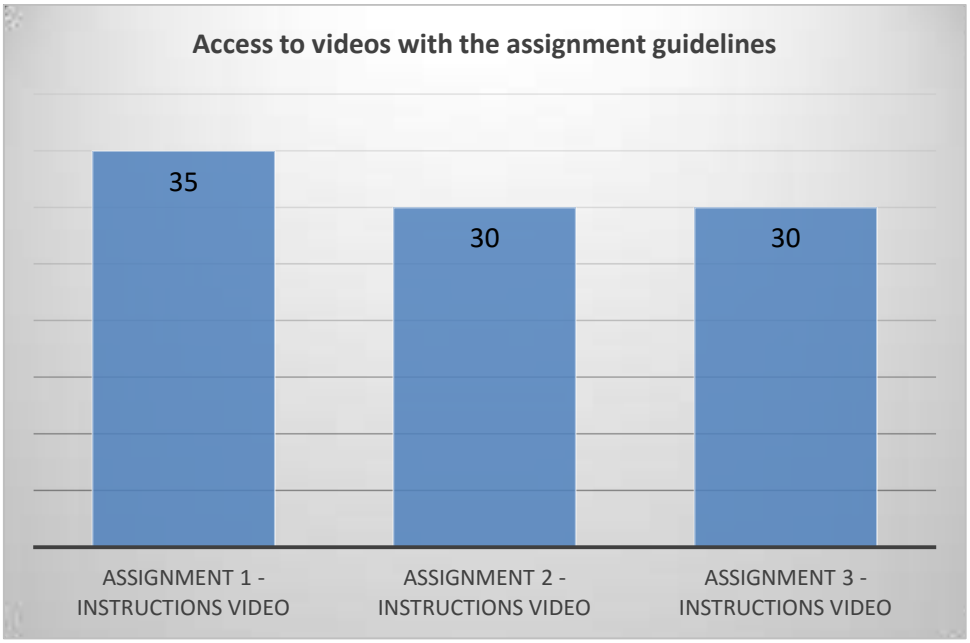

Fig-10: Access on D2L from students to video guidelines for the assignments

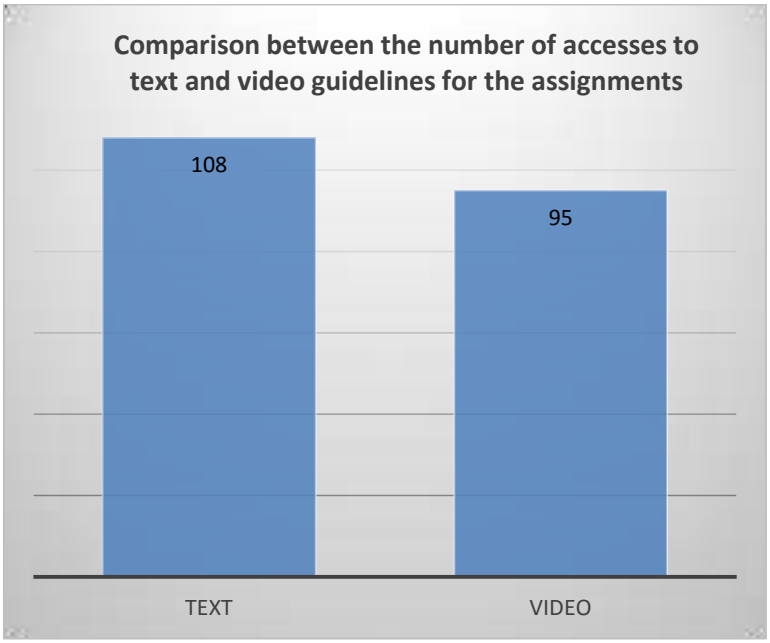

Fig-11: Access on D2L from students to the written and video guidelines for the assignments

When comparing the accesses on D2L to both, .doc and video guidelines, Figure 11 suggests that .doc guidelines had slightly more accesses than the video.

DISCUSSION

Quantitative and qualitative results from the questionnaire indicated that students had more than one preference for instructional formats. This agrees with other researchers [4, 1] who also reported similar results. Qualitative comments and data in Figure 3 support the need for a variety of instructional formats to accommodate student preferences.

However, a closer look at Figures 1 and 7 suggest some inconsistencies. Although the most preferred format was PPT with voiceover (20) followed by video (18) and text (10) to access the course content, the D2L statistics (Figure 7) reveal that written resources (PDF and .doc files) had 488 accesses while PPT with voiceover had 172 accesses. The results from D2L agree with student learning styles in which most (28) said in the questionnaire that they were visual learners. A possible explanation for the conflicting results could be student did not connect their behavior with their response to the questionnaires. They may in principle consider PPT with voiceover preferable but in practice they used text. In addition, having multiple

formats for content and assignments on D2L was most likely a new experience for students and they may have been more comfortable with using text which they are used to having. Since this study could not provide the statistics for the YouTube video access for the content, further research is needed to validate student behavior.

Overall access to the PPT (with text only) was higher for most of the weeks, decreasing at the end of course. Students may have felt that they did not need the text to be read to them.

Regarding the written guidelines and video guidelines for the three assignments, Figures 4, 9 and 10 suggest that student used each format close to the same number of times. Statistics from D2L (Figures 9, 10 & 11) show that students accessed the written guidelines slightly more frequently than the videos. The difference in access is most pronounced for assignments 2 and 3. If one considers that this was the first time students had access to assignment guidelines using the two formats, although students indicated a preference for the visual (e.g. text), maybe some accessed the video guidelines for the novelty or for reassurance that they understood the assignment.

Figure 2 show that students indicate that the course topics influenced their choices of instructional format. Looking at the qualitative comments, it is possible that some students used multiple formats for topics that were difficult for them to learn. More research is needed in this area. Most students were new to research methodology, and some found the content difficult and these factors may have impacted their choices.

Furthermore, findings from the questionnaire reveal that 24 students indicated that they preferred using a PPT as a means to deliver and support their oral presentation despite the flexibility to choose any format. In fact all 38 students used PPT in their oral presentations. Some reasons for this pattern may be that PPT was familiar to them and it was easy for them to use. In addition, their instructor used PPT for her presentations which may have served as model for students to emulate and influenced students' choice to use PPT. Results in Figure 5 may suggest that many were satisfied with the flexibility of choosing any format for their oral presentation but they did not venture to use other tools. Additional explanation for their choice could be that most did not feel comfortable using new formats and/or spending time learning how to use it due to workload even if other formats matched their preferences.

This exploratory study contributes to further the discussions on student preferences regarding instructional formats and their learning style in blended learning environments. This is especially useful within the Gulf region where few studies of this nature have been conducted. There is some evidence that faculty members in higher education in the region use multiple formats to present material. However, the course in our study differs in that multiple formats were used for the same material. Thus it is beneficial to determine whether this multiple format presentation meets students learning needs. In addition to provide alternatives formats, this paper suggests:

1) Supporting students to select alternative formats for their projects and presentations through training sessions or workshops;
2) Conducting a needs assessment before creating alternative formats to include students' feedback into instructional design. In this study, some students recommended improving course materials to support their learning better.

CONCLUSIONS AND RECOMMENDATIONS

This study explored students' preferred instructional formats based on their learning styles within a blended learning course.

Finding ways to meet the students' learning preferences and learning styles may help improve the educational process and contribute to its success. It would also allow instructors to adapt the instructional design to their students' characteristics as well as their preferences as suggested by Riener & Willingham [7].

This study intended to answer four research questions about students' preferences of instructional material formats.

Students said that their preferred means of representation to support their learning were PowerPoint with voiceover and videos followed by text. The reasons given for these preferences relate to the fact that these formats make possible a better understanding of the content as well as provide more information. Students also mentioned that these formats adapt to their study pace and helped them to have a deeper knowledge of subjects.

The course topics seem to have influenced 74% of the students in their choice of the different means of representation. The reasons mentioned were that the format made the content more interesting and easier to understand, and provided more explanations. Having access to different means of representation to study and to present their assignments was also found either very helpful or somewhat helpful by most of the students. Students also suggested that more formats like recordings of the instructor sessions and illustration diagrams could have been used.

The format most accessed during the two courses was PDF and .doc resources. One of the reasons that may

help explain this is that this format was also the one in which the majority of the resources was offered to students (course content and assessment guidelines). Students also said that the reading materials allowed them to go back and reread the content as many times as necessary which they found very useful. More research is needed to find the reasons why despite the preference for such a variety of instructional formats students still used text more.

Regarding learning styles most of the students said that visual was their preferred style. This is consistent with what was observed in relation to the most accessed resources during the two courses. As stated before PDF and .doc files were the ones that students accessed most. Taking students' preferred method of processing and conceptualizing information [9] into consideration when designing and implementing education practices is very important as suggested by Akkoyunlu and Soylu [5], Riener and Willingham [7] and Akbulut and Cardak [6]. Despite the utility of using the students' preferred formats, instructors must also take into account that exposing them to new and different formats can be a way to stimulate the necessary skills to function effectively as students and professionals [1].

Students' perception of their learning styles and the use they made of different means of representation based on its usefulness may vary [14] which can indicate the need for further studies in this area.

In the future researchers might consider larger and heterogeneous samples to validate the results. Within the Gulf region, researchers might present questionnaires in Arabic, and include interviews to obtain more in-depth information on student access to content and their opinions about preferences. It would be interesting to investigate the relationship between course content and student usage of formats to ascertain whether their choices are based on preferences or needs and what the impact on their learning might be. Further studies could investigate other types of content formats. Research could be conducted on the impact of use of multiple formats for different content and include student preferences.

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