TWO PEDAGOGICAL MODELS OF VIDEO INTEGRATION IN MULTIPARTICIPANT COURSES

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ABSTRACT

To respond to needs arising from the field and institutional constrictions, various video-integrated teaching methods were offered to students in multiparticipant courses. Two hundred ninety-five students studying in two Sociology of Education courses agreed to participate in the research. One hundred sixty-two students participated in Course 1, in which all the lectures were recorded and three studio recordings were included in the course. One hundred twenty-three students participated in Course 2, in which only two lectures were recorded and four studio recordings were included in the course. The study aimed to identify the students' learning preferences, their attitudes regarding the use of video recording, and the extent to which recorded lectures influenced attendance. Students' video use patterns and attitudes were elicited from an online questionnaire, including 17 closed-ended questions and two open-ended questions. Quantitative data were analyzed with SPSS software and responses to open-ended questions underwent content analysis. The findings indicated that the students saw video-assisted learning as a positive experience that helped them to understand the learning materials. The recordings of the lectures that were uploaded to the course site responded to various student needs. These conclusions are significant given the intention to use video technology to improve teaching, provide improved teaching-learning experiences, and inform construction of video-assisted pedagogical models in teaching.

Key words: multiparticipant courses, video in teaching, lecture recording, studio recordings.

INTRODUCTION

In recent years, there has been an increase in the use of video-filming in teaching, and a range of teaching-learning processes are available to be used inside and outside the classroom. This growth stems from improvements in the technological abilities of computers and other mobile tools able to present videos. In parallel, Generation Y has become used to consuming visual content in many domains, including learning. Thus, the broad publication of video-based courses on the Internet, such as Massive Open Online Courses (MOOCs) based on filmed lectures, has increased interest in filming and integration of video in teaching (Kandzia, Linckels, Ottmann & Trahasch, 2013). It is expected that by 2018 the consumption of video will constitute 80%–90% of global Internet traffic, and only those institutions that adopt video technology will be ready to respond to students' needs (Opidee, 2014).

LITERATURE REVIEW

Although most lecturers recognize the benefits of lecture recordings for students and for themselves, they also understand its disadvantages, such as a negative effect on attendance and student focus. Some lecturers are skeptical regarding the use of video in teaching and see it as something that may restrict the style and structure of lectures

or lead to lazy learning habits (Christ, Arya, & Chiu, 2017; O'Callaghan, Neumann, Jones, & Creed, 2017). The learning effectiveness of video lectures varies depending on what is being taught, who the learner is, and the presence or absence of an instructor (Hong, Pi & Yang, 2018). Those who advocate integrating video into higher education argue that it has the potential to improve learning, cut costs, attract high-quality students, make the lecturers more accessible for students, and increase the effectiveness of the lecturer's work (Barbier, Cevenini, & Crawford, 2012). For the students, the use of video increases their interest in the learning materials, enhances their concentration, improves memorization of the subject matter, and provides a deep background concerning the subject matter (Bravo, Amante, Simo, Enache, & Fernandez, 2011; Kosterelioglu, 2016; Zhang, Zhou, Briggs, & Nunamaker, 2006).

Greenberg and Zanetis (2002) list three main dimensions that influence the integration of video in teaching for students:

1. interaction with the contents—the learner relates to the visual contents, whether verbally, or in writing, thought, or conceptual application.

2. involvement—the learner is likely to remember and absorb the contents in a better manner than through other media.

3. transfer their learning into long-term memories.

Additionally, video recording empowers the students since they have the ability to view it at a suitable time and consume the filmed material at a pace and amount that is appropriate for them (Fernandez, Simo, Castillo, & Sallan, 2014). There are also advantages for higher education institutions when using video. It can help them to solve issues when simultaneously delivering two courses and/or when there is a shortage of classrooms, and it also makes it possible to reuse learning materials in future courses (Kandzia et al., 2013). Pedagogically, the integration of video in teaching can lead to alterations in the teaching paradigm. Video permits a transition to student-oriented teaching and enables the teacher to focus on the student's needs. With appropriate mediation, video can facilitate the broadening of learning beyond classroom hours and allow time in the classroom for discussions and participatory exercises (the Flipped Classroom Model; Lage, Platt & Treglia, 2000).

MODELS FOR INTEGRATING VIDEO IN TEACHING

Web-based lecture recording technologies (WBLT) are digital recording systems that replicate face-to-face lectures to transmit them via the Internet. Video helps to record what happens in the lesson and recorded video lectures can be used during the classroom lesson or in an online lesson (Brecht, 2012). Professionally produced video lectures constitute a good alternative to replace traditional lectures (Hürst & Waizenegger, 2006).

From a pedagogical viewpoint, Figure 1 shows that it is possible to see the various possibilities for integrating video into teaching along an axis that starts at several basic levels that allow existing films to be used or complete lessons to be filmed and moves up to more complex levels that necessitate different pedagogical models and the production of recorded video lessons (Seifert, 2015). In some of the courses, the aim of integrating video into teaching is to film the lessons, but in online courses it is necessary to adapt the content of the lesson when integrating video into teaching.

As can be seen in Figure 1, there are many ways in which video can be integrated into teaching:

1. using films from open collections, such as YouTube, in traditional teaching;

2. filming lectures for the benefit of a course, such as documenting lectures that take place in the regular classroom with the course students;

3. producing teaching films in a studio/classroom without students;

4. using films in an appropriate pedagogical form adapted to teaching with video, such as in the Flipped Classroom model, which leaves time in the classroom for active learning instead of frontal lectures (Roehl, Reddy, & Shannon, 2013); and

5. creating films on the course topics by the students.

The various approaches represent various teaching methods along a continuum from teacher centered (1) to student centered (4). The benefits of these approaches vary greatly, as students creating video as a course activity can be much more powerful than students watching a lecture. This study focused on lecture documentation on film as opposed to producing video-learning materials and applying video-based pedagogical models.

RECORDED LESSONS

Recording lessons is a routine matter in most

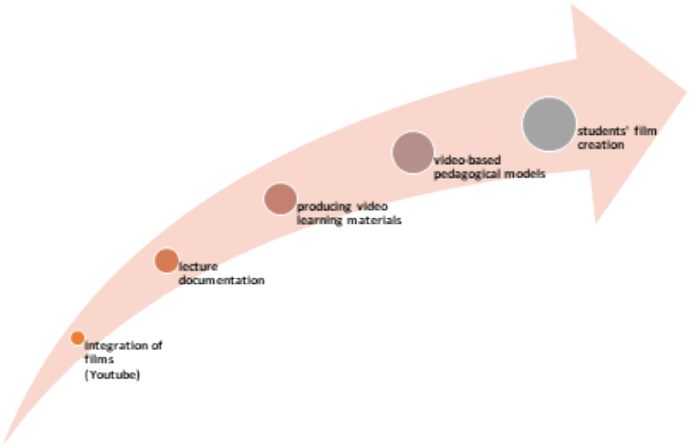

Figure 1. Axis of Possibilities for the Integration of Video into Teaching

higher education institutions. Recorded lectures have been found to have many benefits; for example, they allow greater flexibility both for the lecturers and for the students regarding the use of the recorded material (Kandzia et al., 2013). Although studies conducted in the last five years show a significant increase in the incorporation of video in teaching, this research was not sufficiently comprehensive, and there have been recommendations to focus future research on the learners' behaviors, the effectiveness of teaching with video, and the level of student satisfaction regarding the viewing of recorded materials (Giannakos, Jaccheri, & Krogstie, 2014).

The extant literature in this field indicates that video quality is most important in the students' eyes, so the filming of lectures should be high quality to meet the students' needs and comply with professional requirements (Müller & Ottman, 2003; Sankey, 2013). A review of the literature reveals that many different factors influence video quality and how students perceive the value of filmed lectures, such as the voice and picture quality and eliminating background noise, video length, the repetition of material, maintaining confidentiality, using materials for active learning, revising materials, testing, overcoming linguistic difficulties, understanding the material (Sadik, 2016), and interacting with the video. Consideration of these factors and characteristics constitute a first step towards the full exploitation of the potential of video-filmed lectures and the effective use of classroom time.

Research shows that students prefer the quality and ease of use of studio recorded lectures rather than lower quality lesson videos. The students find that studio recordings can be controlled better, which makes viewing them easier (Sadik, 2016). Students also suggested that video should be used for short periods of time, in accordance with teaching goals and to a moderate extent. The video allows regular documentation that can be viewed at any time that is comfortable for the user and according to the desired level of detail (Tan & Towndrowb, 2009).

It is important to decide when to include a previously recorded video or when to record the lecture. For example, using a recorded video frees the students from the need to record the full lecture word for word so they can instead focus on listening to the lecture (Davis, Connolly, & Linfield, 2009). With suitable design, studio recordings can encourage students to enjoy the benefits of different learning approaches that engage the students and increase their understanding and absorption of content that is essential for a successful learning process (Jamaludin & Osman, 2014). Research indicates other benefits of recorded lessons (McElroy & Blount, 2006): 75% of students noted that video helped to improve their learning (Soong, Chan, Cheers & Hu, 2006) and video helped students revise the learning material and prepare for exams (Copley, 2007; McElroy & Blount, 2006; Williams & Fardon, 2007).

Despite the extensive use of video-streaming as a tool to support and facilitate learning, (Shephard,

2003) one of its major drawbacks is the inability of the learner to fully interact with the medium (Laurillard, 2002) and the lack of user control. With the recent advances in multimedia technologies, the interactivity of instructional video can be enhanced. Some lecturers think that the easy availability and comfortable access of recorded lessons will reduce students' attendance in lessons and negatively influence their learning (Chang, 2007; Scutter, Stupans, Sawyer, & King, 2010) and reduce the level of classroom interaction (Mark, Vogel, & Wong, 2010). There is no consensus among researchers on whether the accessibility of recorded lectures does have such an influence on students' attendance in face-to-face lessons. Some studies found a 10% to 30% reduction in lesson attendance (Taplin, Low & Brown) while other studies did not find any correlation between the availability of recorded lectures and greater absence from lessons (Copley, 2007; Larkin, 2010; von Konsky, Ivins, & Gribble, 2009). Williams, Birch, and Hancock (2012) found that students who used recordings as a substitute for attending live lectures received lower final grades. However, those students who supplemented live lecture attendance with additional recording use performed better than those who only attended live lectures. Wieling and Hofman (2010) found that while both attendance and watching recordings were positive predictors of students' final grades, viewing lecture recordings was a greater benefit for those students who had lower lecture attendance.

It is important to integrate recorded lectures in a pedagogical manner and in accordance with the lesson contents (de Corte, 1996; Salomon & Perkins, 1996). Integrating recorded lectures using pedagogical considerations can contribute to the students' performances and provide a positive experience (Larkin, 2010). Thus, recorded lectures should be seen as supplements to face-to-face lectures and not as a competing strategy (Yeung, Raju, & Sharma, 2016). When video is produced according to pedagogical requirements, it is recommended that short, focused videos that will arouse interest should be considered (Sankey, 2013). Audio and video clarity are important (Stetz & Bauman, 2013), background noise, students' participation, or snatched chats can be distracting for students (Gysbers, Johnston, Hancock, & Denyer, 2011). Lecturers should use video as value-added, supplementary material for what was transmitted during the lesson (Tam, 2012).

PURPOSES OF THE RESEARCH AND RESEARCH QUESTIONS

The purpose of this research was to clarify students' attitudes concerning video-assisted learning with regard to both the technological and pedagogical needs of learners. An additional goal was to compare the attitudes of students in two courses according to two different pedagogical models for video integration: the first course was based mainly on video documentation of all the course lectures and the second course was based on video documentation of a just two of the lectures. The research questions were:

RQ1: What are the students' learning preferences when using video recordings?

a). What learning preferences do students have when video recordings are integrated in the course?

b). Is there a difference between the learning preferences of students in courses where all lectures were recorded and the learning preferences of students in courses where just two of the lectures were recorded?

c). Is there a difference between the extent of recordings viewed by students in courses where all lectures were recorded and recordings viewed by students in courses where just two of the lectures were recorded?

RQ2: What are the students' attitudes regarding the use of video recordings?

a). What are the students' attitudes regarding the use of video recordings during teaching and learning?

b). Are there differences between the attitudes of students in a course where all lectures were recorded and students in a course where only two lectures were recorded?

RQ3: To what extent does the recording of lectures influence the students' attendance of lessons in the course where all lectures were recorded and in the course where only two lectures were recorded?

RESEARCH METHOD

In recent years a large academic college in the center of Israel has begun to use video in an extensive manner for different teaching needs in face-to-face courses, in hybrid courses that include face-to-face lessons and online lessons,

and in distance learning courses. The academic computerization unit of the college offers lecturers different possibilities for documenting lectures and preparing films that can be integrated into their lectures. In the first year of video use, 39 lectures were recorded in 13 courses. Some of the lectures that were recorded served to prepare 24 instructional films. The links to all the lectures can be found on the course sites and are offered to the students. This present study was performed with the goal of continuing to develop models for integrating videos into teaching and improving the methods integrating videos in teaching.

The research followed a mixed-methods paradigm employing quantitative and qualitative data-collection and analysis methods (Johnson & Onwuegbuzie, 2004: Keeves, 1988). The quantitative data were analyzed with SPSS software and included various statistical analyses including descriptive statistics and *t*-tests for independent samples, frequencies, and correlations. Content analysis was applied to the students' responses to open questions and subject categories were derived from their texts (Yin, 2008). The students' responses were cited in their own words. The responses were encoded using numbers to signify and mask respondents' names.

The Research Sample

The research sample included 295 students participating in two Introduction to Sociology of Education courses. These courses are basic, compulsory courses taken by students in their first semester at the college. In the past they were taught to smaller classes, now they are taught as multiparticipant, face-to-face courses with 150 students studying in each course. The two courses employed video in their lessons for the first time in the studied academic year.

In the first course, taught by Lecturer A, there were 162 students. The use of video included video documentation of all the lectures that took place in the class (a total of 14 video recordings). In addition to the video documentation of the lecture, three studio recordings about 15 minutes long each were produced and implemented as part of the learning units. In the parallel course taught by Lecturer B there were 123 students. In this course, four studio video recordings were produced as part of the lesson contents and they were uploaded to the course site. The two lecturers were experienced in teaching the content of these courses and in teaching online. The first course will be referred to as the "fully video-integrated course" and the second course will be referred to as the "partially video-integrated course."

The Research Tools

The research tool comprised a questionnaire administered to the students online that asked for the students' attitudes towards the integration of video in teaching. The questionnaire included 17 closed-ended questions that were constructed by four researchers from the college's ICT unit who assisted the lecturers in integrating video in various courses according to the specific needs (see Appendix A). In line with the research questions, the questionnaire asked two general questions (such as their age) and four about the students' learning preferences (such as their learning methods, viewing times, etc.). The questionnaire asked 11 questions about the students' attitudes regarding aspects of the integration of video in teaching (e.g., satisfaction regarding the technical quality of the films, the contribution of recorded lectures to their understanding of the course learning material, and the influence of video on their personal learning preference). The "technical quality" was defined as the clarity of the video while the "pedagogical quality" was defined as the clarity of the presentation of the content knowledge.

Students graded their responses to these items on a scale of 1–5 where 1 = not at all, 2 = to a slight extent, 3 = to a reasonable extent, 4 = to a large extent, and 5 = to a very large extent. Two open-ended questions aimed to allow the students to write about their insights beyond what they had been asked in the closed-ended questions. In their responses to the open-ended questions, the students related how they experienced learning with the assistance of videos, the advantages and disadvantages of this method of learning, and their recommendations and suggestions to improve the use of video in the academic courses. At the end of the courses, all the students were asked by the institute ICT and research unit to answer questionnaires regarding the integration of video in their courses. The importance of their completing the questionnaire was emphasized for the application of video in future courses. Approximately 40% of the students (114) agreed to complete the questionnaire anonymously at the end of the course.

FINDINGS

This section presents the findings from the responses of the 114 students who completed the questionnaire that was administered to 295 students (40% response rate). Among the participants, 70 respondents (61%) were studying the fully video-integrated course and 44 respondents (39%) were studying the partially video-integrated course. The findings are presented in line with the research questions.

Question 1: what are the students' learning preferences when using video recordings?

One of the intriguing questions concerning how students learn in a course is which means helped them to learn about the course contents and to what extent they used the films that were uploaded to the course site. The distribution of the students' answers regarding the ways in which they learn about the course contents is presented in *Figure 2*. The students could choose more than one answer.

As can be seen from Figure 2, the students' preferred way to learn about the course content is to attend the lessons and learn by listening to the lecture. Most of the students (82%) noted this learning preference. Among the students in both groups, approximately 66% learn from textual materials that the lecturer uploads onto the course site such as presentations and summaries. Learning from videos was only in third place since 55% of the students noted that they were assisted by learning from the films. Approximately 43% used other materials that were found outside the course site, such as articles and books. The item "other" included assistance from Internet sites or a family member.

A parallel question investigated to what extent the students viewed the video recordings that were uploaded to the course site (see Figure 3).

From the responses shown in Figure 3, the distribution between viewers and nonviewers of the recorded lectures was almost equally divided. Approximately 52% watched the recordings to a large or reasonable extent and 48% did not watch the recording at all or only viewed them to a slight extent. Figure 4 shows the distribution of students' responses regarding viewing of the recordings in the two different groups.

A comparison of viewing of the recorded lessons in the two groups, as shown in Figure 4, indicates that only the students in the fully video-integrated course watched the recordings to a large extent (37%). An almost equal number of students in both groups reported watching video recordings to a reasonable extent (26% in the fully video-

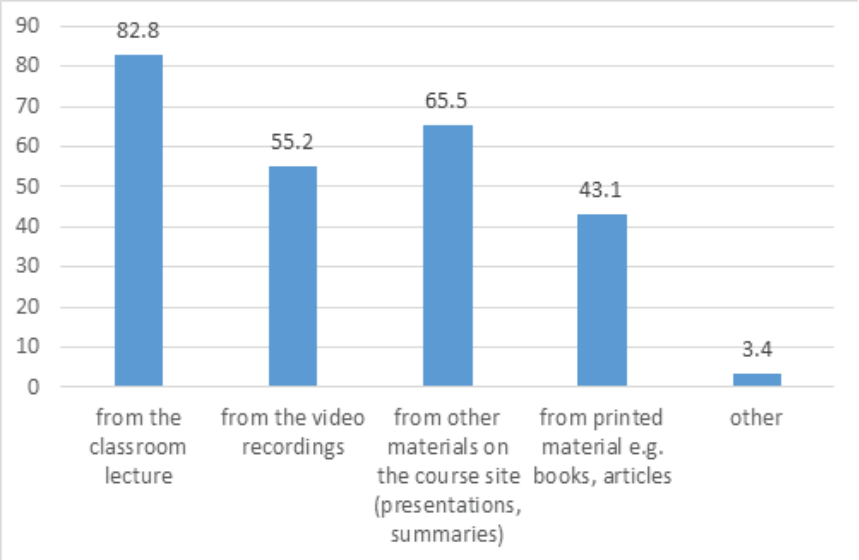

Figure 2: Percentage of Respondents Who Noted Different Ways of Learning Course Contents (Students Could Choose More Than One Category) (N = 114)

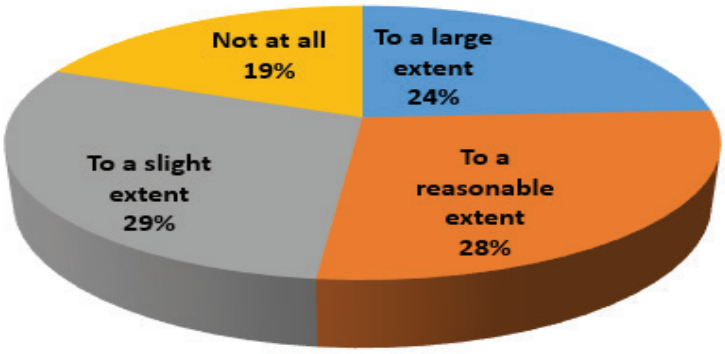

Figure 3. Extent of Video Viewing by Students in Both Groups (%)

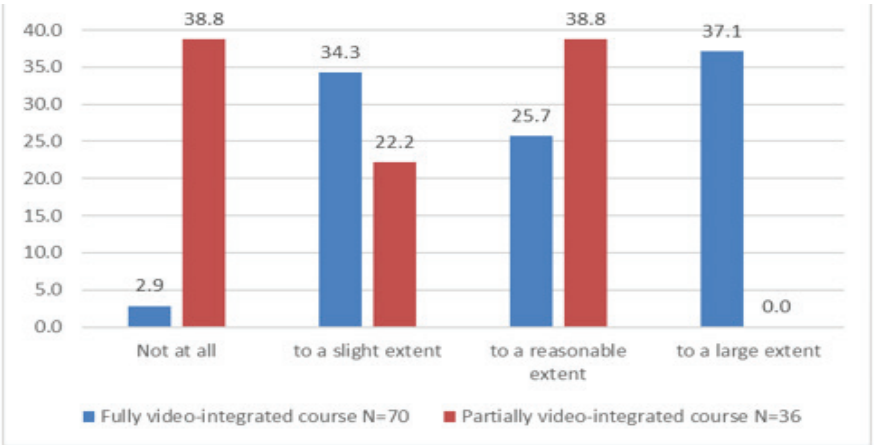

Figure 4. Extent of Recordings' Viewing by Course Group (%)

integrated course and 39% in the partially video-integrated course), while 34% students from the fully video-integrated course and 22% students from the partially video-integrated course reported viewing the recordings to a slight extent and 39% students from the partially video-integrated course and only three percent of the students from the fully video-integrated course reported not viewing the recordings at all.

It would also be interesting to know how often the students learned from the video recordings. Do they view them each week? Do they only view them before an exam? Figure 5 shows the distribution of the students' responses to these questions.

According to the data shown in Figure 5, most of the students in both groups used the recordings in preparation for assignments (41.7%) or an exam (25%) and only 13.9% students watched the recordings immediately after they were published. The students noted as "other" watching lectures when they did not understand some particular subject matter or watching lectures while travelling. A *t*-test for the independent samples/OR variables that compared the distribution of results for the two different groups regarding the variable "viewing the video recordings" showed significant differences in the extent of viewing by students in the two groups ($p < 0.001$, $t(104) = 5.3$). Figure 6 displays the comparison of the students' viewing of the recordings in the two groups.

The data shown in Figure 6 indicate that the trend of viewing time for the recordings is very similar in both courses, and that in both courses most of the viewing was performed near the performance of an assignment (approximately an average of 47%). In the fully video-integrated course fewer students noted that they had not viewed the recordings and more students indicated several reasons why they had viewed them (in preparation for a lesson, when they missed a lesson, in order to revise the

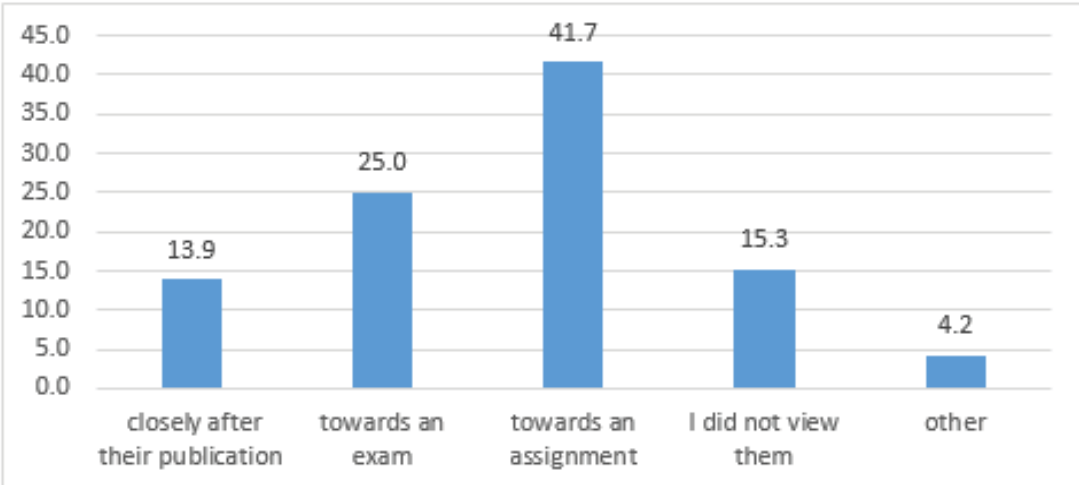

Figure 5. Students' from Both Groups Viewing Habits for the Video Recordings (Students Could Choose More Than One Category) (N = 144)

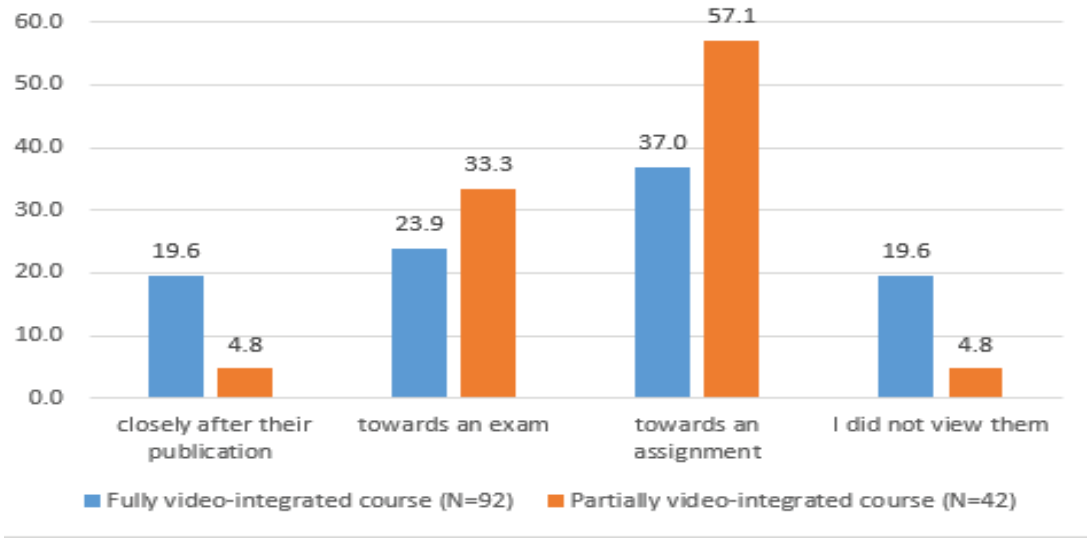

Figure 6. Comparison Of Students' Viewing Habits Between The Two Groups (N = 144)

subject matter, or when they had not understood the subject matter). In the fully video-integrated course there was a larger number of students who viewed the recordings immediately after they were published (19.6%) in comparison to the partially video-integrated course where only 4.8% of the students viewed the recordings immediately after their publication.

Following their use of the video, the students felt that they experienced learning that was more suitable for their needs. S2 from the fully video-integrated course said:

> *. . . in general the use of technological means in the course added a lot. Learning with the integration of video films and supplying the students with recorded lessons releases the students from the obligation to write and summarize and allows us to listen during the lesson.*

In the same context, S8 from the fully video recorded group added:

> *The recorded lesson is a good idea. It allows us to go over the materials again at home and its good for those who missed it. It helped me a lot when I went out on scientific trips and it will help me significantly to*

succeed in the exam.

S7 from the fully video-integrated course also noted:

> *It allows us to view the contents at night or at the weekend and to learn with them whenever it is conveninent. It allowed me excellent learning, far more comfortable and pleasant than sitting in the classroom.*

Another student, S12, from the fully video-integrated course, related to learning with the help of video as something independent and relaxing:

> *the video films give us independence to investigate a subject by ourselves. This learning method becomes most independent and convenient! The fact that the lesson exists in the form of a film makes my learning experience in the classroom calmer. I can be more attentive to the lecturer and less pressed to summarize because the lesson is available on my computer, and if I do not understand something in the lesson, I know that I can watch the film at home. Also, when I watched the films I could stop when it was comfortable for me and go back in order to understand things more profoundly or if I missed something or something was unclear. It's simply wonderful!*

Her words were reinforced by the testimony of S18 from the partially video-integrated course:

> *It's very effective because it's possible to stop, go back, look simultaneously at some other material, etc. It helps to internalize the material in a very efficient and personal manner.*

Another advantage was noted by S3 from the partially video-integrated course:

> *In my opinion learning with the video is really good and effective. It helped me a lot. I understood more than I learnt in class, the lecturer spoke in a more consecutive manner and not as he did in the class with interruptions of a lot of students' questions. It strengthened the learning.*

Question 2: What are the students' attitudes regarding the use of video recordings?

Table 1 shows the students' consideration of different aspects of the integration of video in teaching.

Table 1. Students' Attitudes to Different Aspects of Video Integration in Teaching (1 = not at all; 4 = to a large extent).

Characteristic	Mean	SD
Satisfaction regarding the technical quality of the films	3.8	0.51
Satisfaction regarding the quality of the films' contents (pedagogy)	3.7	0.70
Videos help to understand the subject matter	3.7	0.56
Contribution of the recorded lectures to understanding the course materials	3.4	1.01
Extent of the students' investment in the course beyond their attendance in the lessons	3.4	1.00
Sense of active participation during the course	2.5	1.05

It is evident from Table 1 that the students were satisfied with the technical quality of the films (M = 3.8) and their pedagogical quality (M = 3.7). According to the students' reports, the videos helped them to understand the subject matter (M = 3.7). For some of the students, the recorded lecture was a replacement for the classroom lesson (M = 2.8). A comparison was drawn between the attitudes of the students in the two groups. The results of this comparison appear in Table 2.

The data shown in Table 2 indicate that the students in the fully video-integrated course expressed a significantly higher level of satisfaction in comparison with students in the partially video-integrated course in all the parameters. They had higher assessments of the pedagogical ($p < 0.001$, $t(106) = 3.74$) and technological ($p < 0.001$, $t(104) = 3.89$) value of the films, and they had a higher estimation that the videos helped them to understand the subject matter ($p < 0.001$, $t(110) = 4.18$) and a significantly higher estimation of their investment in the course beyond their attendance in class ($p < 0.1$, $t(110) = 1.80$). The largest gaps between the two courses was found with regard to the grades given for contribution of the recorded lectures to the students' understanding of the course materials (fully video-integrated course: M = 3.7, ±0.51; partially video-integrated course: M =

Table 2. Comparison of the Attitudes of Students in the Two Courses Regarding Aspects of Video Integration in Teaching.

Aspect of video integration in teaching	Fully video-integrated course (N=70) Mean (±SD)	Partially video-integrated course (N=44) Mean (±SD)	t	df
Satisfaction regarding the technical quality of the films	M=3.9 (±0.24)	M=3.5 (±0.67)	3.89***	108
Satisfaction regarding the quality of the films' contents (pedagogy)	M=3.9 (±0.38)	M=3.3 (±0.91)	3.74***	106
Videos help to understand the subject matter	M=3.9 (±0.24)	M=3.4 (±0.74)	4.18***	110
Contribution of the recorded lectures to understanding the course materials	M=3.7 (±0.51)	M=2.7 (±1.30)	4.24***	110
Extent of the students' investment in the course beyond their attendance in the lessons	M=3.3 (±0.80)	M=3.0 (±0.79)	1.80*	110
Sense of active participation during the course	M=2.8 (±1.00)	M=2.0 (±0.88)	4.72***	112

*p<0.1; **p<0.01; ***p<0.001

2.7, ±1.30, $p < 0.001$, $t(110) = 4.24$) and for the sense of active participation in the course (fully video-integrated course: M = 2.8, ±1.00; partially video-integrated course: M = 2.0, ±0.88, $p < 0.001$, $t(110) = 4.72$).

Question 3: To what extent does the recording of lectures influence the students' attendance of lessons in the course where all lectures were recorded and in the course where only two lectures were recorded?

An important subject that was a cause for concern for several lecturers was the level of attendance in the lectures that where recorded. The lecturers feared that student attendance would wane if the students knew that the lesson recordings appeared on the course site and could replace attending the lesson. In the studied courses there was compulsory attendance as accepted in college courses. Integration of the video was performed to investigate its contribution to the lessons and to clarify the students' attitudes towards integrating this tool into teaching.

In Question 3 the students related to two teaching models (fully video-integrated course, partially video-integrated course) in connection with their lesson attendance and their satisfaction regarding the integration of recorded lectures in different lessons. The students were asked if their attendance at lessons altered as a result of the availability of the recordings. Figure 7 shows the distribution of the students' answers to this question.

The results of the *t*-test for independent variables ($t(54) = 1.6$) were used to compare the distributions in the two groups regarding the extent of students' lesson attendance. There were significant differences in the number of students coming to lessons between the two groups ($p < 0.1$*). Figure 8 shows the distribution of the students' answers in both groups.

The comparison shown in Figure 8 indicates that for most of the students, the uploading of the recorded lectures to the course site did not lead to a reduction in their attendance in the two courses. In the group where there were recorded lectures available for all the lectures, nine students noted that the availability of the films led to a reduction of their attendance in lessons. Students' attitudes in the course where all lectures were recorded were compared to attitudes of students in the course where only two lectures were recorded with regard

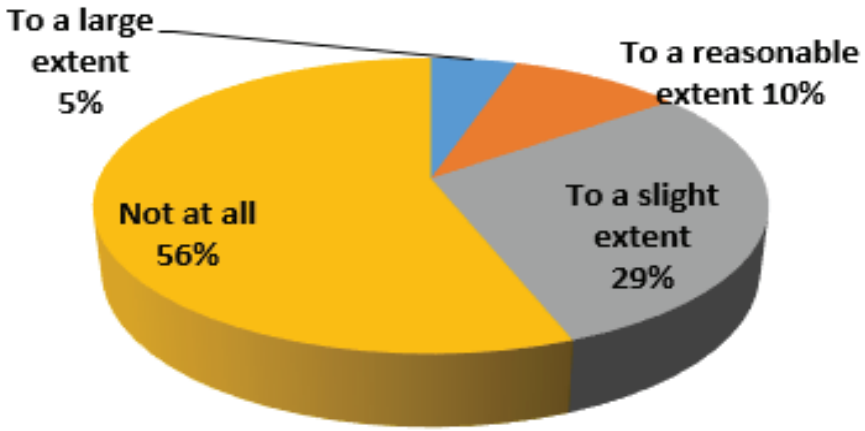

Figure 7. Level of Students' Attendance Following Availability of Lecture Recordings

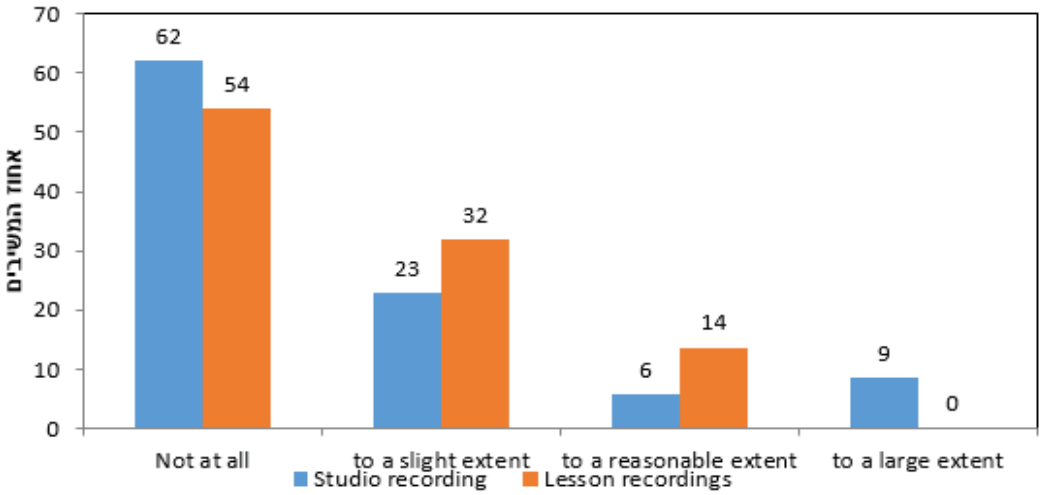

Figure 8. Comparison of the Distribution of Students' Answers in the Two Groups Concerning the Extent to Which the Uploading of the Video Recordings Led to a Reduction of Student Attendance in Lectures

to the level of attendance mapped according to the number of sessions. This mapping is shown in Figure 9.

As can be seen in Figure 9, 31% of the students reported that they went to all the lessons while most the students (59%) reported that they missed just one or two lessons. In other words, the students complied with the duty of attendance that allowed them a 20% absence rate.

The *t*-tests for the independent variables, which compared the distribution of answers between the two groups with regard to lesson attendance, showed significant differences in attendance between the two groups ($p < 0.1$, $t(112) = 1.9$). Figure 10 shows the comparison regarding lesson attendance according to number of sessions between the two groups.

Figure 10 clearly shows that few students missed more than four lessons, with 11.4% students in the fully video-integrated course and 4.5% of the students in the partially video-integrated course missing 3–4 lessons. A large number of students in both groups missed 1–2 lessons (fully video-integrated course = 48.6%, partially video-integrated course = 72.7%). In the fully video-integrated course 40.0% students reported attending all the lessons but only 18.2% attended all the lessons in the partially video-integrated course.

The students valued short, focused lectures as tools that helped their learning process. However, they also wanted each lesson to be recorded for their convenience, as noted by S9: "reactions to the video films, reactions on the blogs and to perform an unseen exam each week at home and to present in Moodle LMS." Supporting the videos, S16

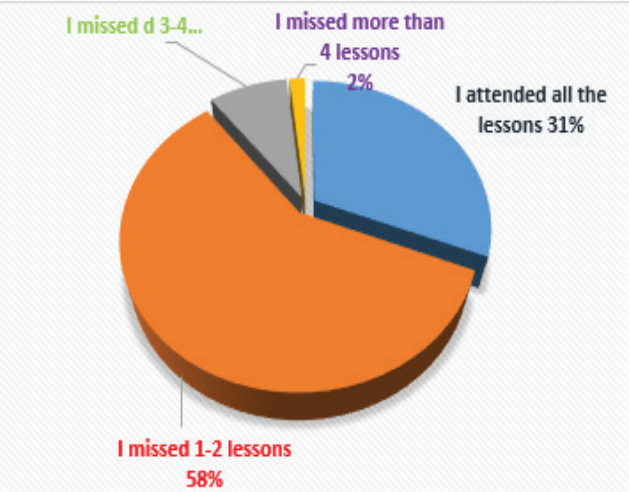

Figure 9. Distribution of Students' Level of Attendance in Lessons

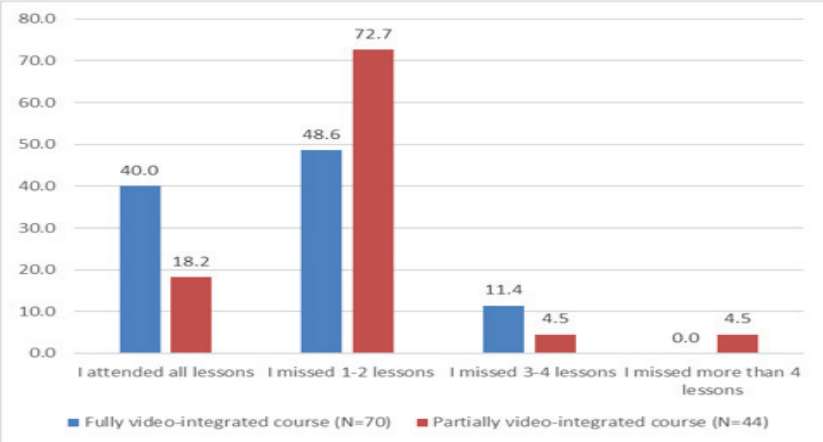

Figure 10. Comparison of the Distribution of Students' Lesson Attendance in the Two Groups (%)

suggested:

> *upload the films as much as possible for those who missed a lesson or two. Recordings of the lessons were uploaded two to three weeks after the lesson and that was no longer effective since it was impossible to watch them before the next lesson.*

The students also suggested taking care for the quality of the films:

> *In one film the sound was missing (and it was impossible to hear the lecturer at all) and I reported this several times to the technical assistance and to the lecturer and nothing was done. I feel it's a pity, it was an interesting lesson (S72).*

And in relation to the length of the films, S8 noted: "in principle it is clear that it would be preferable if the films were slightly shorter, but it is impossible because of the subject matter of the lessons and all of it should appear." It is important to listen to the opinions of those students who used the recorded lessons and derive insights on different aspects that were raised, including the students learning experiences with the video, the advantages and disadvantages of video-assisted learning, and suggestions for improving of video-assisted teaching.

Among the students who supported video-assisted learning, S22 from the partially video-integrated course noted: "The recordings allow the student to overcome the difficulties involved in coming to the lesson and allow them to choose the appropriate time and place for learning." With

regard to the characteristics of the films, students noted that the films had an excellent length and were concise and focused. S25 from the partially video-integrated course added: "I think that the use of films during the course provided variety and helped our learning and understanding of the subject matter." In general, the students' reactions reflect "a very good experience," as S65 from the fully video recorded group noted:

> *I loved listening and learning with a relatively short film* (*up to 25 minutes—light and comprehensively summarizing the lesson in a very satisfactory way*) *because I could stop at any given time, summarize, and continue watching . . . it was also refreshing to come to lessons in the seminar of 45 minutes and not an hour and a half thanks to having watched the films.*

This evidence was reinforced by the words of S38, from the fully video-integrated course:

> *I saw some of the films on the course site. I really liked the use of this means, both the contents and the variety of learning methods. Learning with the help of films is effective, especially in a course like this—where there is a lot of material—it sharpens things, it's interesting . . . films that were too long* (*there was a long interview of about an hour*) *were less suitable.*

In addition to the positive experience of a large proportion of the students, there were also students from the fully video-integrated course with attention disabilities for whom the video-assisted learning method was difficult. S44 explained: "It reiterates the material but helps you to lose your head if you have attention and concentration disorders . . . I don't like learning of this kind especially not for complicated subject matter." S26 added: "Although it makes things easier and allows learning at my individual pace, I personally need human mediation." However, S19 also added:

> *The lesson took place in a large classroom and sometimes it was very difficult to follow what was happening. At home I read the articles while watching the lessons and I feel that contributed a lot to me, especially since I have a learning disorder. The films were of the correct length, concise, and delivered the studied materials in an optimal manner.*

S51 concluded:

> *The recorded lessons help a lot because they are focused on the lesson subject without any interferences and uninterrupted by conversation with the students during the lesson in the classroom. There are also students who find it difficult to listen and write simultaneously, so they miss materials in some way. Filming the lessons transmits the materials to them in a clear and unified manner. Everything depends of course on the lecturer's ability to record the lesson in a clear and comprehensible way. In our case, the films were excellent both technically and with regard to the contents: they included graphs, video clips and the teaching/learning process was easy and clear . . . to adopt the media of a filmed lesson and to include additional contents: pictures, texts, perhaps even an animation etc.*

In order to create an optimal learning experience the students thought it important to ensure the quality of the interface by which the lectures were delivered. They thought the interface should be user friendly and comfortable. S39 noted:

> *The video lessons should be upgraded so that it will be possible to view them with jumps, subtitles, an entry portal, and list of contents, with options to read what is delivered in the lesson in written text, without the video . . . films of a reasonable length and very clear.*

These words were supported by S4: "the viewing was difficult, tiring and irrelevant. The studied subject matter could have been delivered in a presentation or Word document."

Some students needed mediation of the films and there were some who preferred to view the films without intervention and without directed questions. S11 added: "they (the videos) really helped me! When I looked at the video in order to learn I preferred to get guiding points for thought." S55 also noted:

> *learning with the video helps to go over the*

lesson again, deeper understanding when I study at home . . . I think they should combine the video with a guiding question so that there will be general understanding of the video, the video is insufficient without guiding questions. It's a wonderful method, I hope we will have this option in other courses.

S7, who watched peer teaching that she had delivered noted: "watching myself teaching was a special experience, exceptional and very focused. I don't think there is something that could replace that . . . definitely not a thousand words."

DISCUSSION AND RECOMMENDATIONS

This study had a limitation because 70 students responded to the research in the fully video-integrated course in comparison to 44 students in the partially video-integrated course. This inconsistency may have affected the results as well as their significance. Moreover, some of the lectures were uploaded two to three weeks after the initial class was recorded due to technical problems. Uniform timing for the positioning of the lecture recordings online is critical for students to respond to a question regarding the helpfulness of the recordings. The research findings indicate that the viewing of recorded lessons was, naturally, greater in the course where all the lessons were recorded. Nevertheless, a relatively large number of students in both groups (19%) were found not to have watched the recorded lectures or only viewed them to a slight extent (29%). With regard to the viewing habits for the recorded lectures, it was found that the students viewed them far more near the presentation of an assignment (53%). This seems to indicate that the students feel that the recordings have little relevance regarding the lesson that they have just heard or will hear, and that they are more motivated to use the recordings to receive a high evaluation in the course as a result of their submission of assignments and exams. The fact that some of the students in the fully video-integrated course (26%) viewed the recordings immediately after their publications and 26% of the students didn't view the recordings at all indicates that different students have different learning preferences. The availability of the recorded lectures allows different students to choose the learning method most suitable for them, whether it is over the entire course or in particular lessons during the course.

The use of video is one of the essential tools in the teachers' and lecturers' toolbox for the 21st century. Integrating video into teaching can provide a response to several pedagogical needs of lecturers in teacher-education colleges, including:

- adapting teaching to viewing in the appropriate amount, pace, time, and place;
- providing solutions for groups that are too large for discussions in class and can transfer to an Internet space either independently or together with a film;
- providing a response to the need to illustrate processes, historical events, or natural phenomena, broadening teaching means for a course with a high level of difficulty;
- using course components studied in the past;
- teaching a full or partial online course and overcoming limitations of time and place;
- revitalizing "boring" subjects or intense courses where there is restricted time to complete the course material; and
- providing a response for students with learning disabilities.

From the viewpoint of the student, as found in previous studies, introducing videos into lessons allow the student to learn at their own pace and go over the constantly available materials again, to exploit their free time, to become a creator (meaningful learning, 20th century skills), and to save students the cost of textbooks (Fernandez et al., 2014). Nevertheless, it should be remembered that integrating video into teaching can be performed according to various models, and possibilities and pedagogical considerations should be included to introduce it into teaching as suggested by the research literature (de Corte, 1996; Salomon & Perkins, 1996).

Like the reviewed research findings (Bravo, Amante, Simo, Enache & Fernandez, 2011; Kostereliogl u, 2016; Zhang, Zhou, Briggs & Nunamaker, 2006), the present study's findings indicate strong agreement among the students that video-assisted learning helps them to understand the subject matter and it is seen as a positive experience.

The present research findings also confirm previous findings that video documentation of

the lectures, and also preparation of specific films uploaded onto the course site, can be useful for students who missed the lesson and for students who want to go over the material again, whether because they did not understand it properly in class or because they want to prepare for an exam (Copley, 2007; McElroy & Blount, 2006; Williams & Fardon, 2007). It should be remembered that when viewing prerecorded videos, student interactivity is very low. Students are more likely to benefit from learning that is based more on viewing lectures and less on interactivity. Documenting lectures is a basic stage of integrating video into teaching and is more accepted by lecturers. The reason for this may be that documentation of this sort does not entail very much additional preparation by the lecturer in comparison to producing learning films in addition to preparing regular lessons. Nevertheless, documentation of the lectures is the least interactive and sophisticated option for video use, and it entails several difficulties, such as background noise, the quality of filming, and the limitations of maintaining confidentiality for participants (Opidee, 2014). Despite these limitations, some of which can be resolved through technological advances, it seems that this stage is important in order to expose the lecturers to this "new" medium and because it is easier for them to document the lectures. Workshops should be organized for the lecturers to help them in the production and assimilation of the concept of video use in teaching. In planned filming, it is suggested that films should be prerecorded as much as possible while taking care to protect the confidentiality of participants and, in the case of filming lessons in the classroom, the range of the filming should be focused on the lecturer and on the board and not the students.

With regard to student attendance following lesson recordings, the results presented in Figure 7 suggest that the lecturers' fear that students would not attend the lessons was unfounded and most of the students (85%) think that the availability of the videos will only lead them to absent themselves from the lessons in rare cases or not at all. The results presented in Figure 8 indicate (contrary to expectations) that the students in the fully video-integrated course were more determined to attend lessons in comparison to the students in the partially video-integrated course. This is significant and interesting, and it should encourage lecturers since it indicates that even when all the course lectures are documented, the students still feel it worthwhile to attend the lessons. These findings are in line with the findings of previous studies that did not find any correlation between the availability of recorded lectures and greater absence from lessons) Copley, 2007; Larkin, 2010; Scutter et al., 2010; von Konsky et al., 2009(.

As was found in other studies (Lage, Platt, & Treglia, 2000), in this study the integration of video into teaching offered an opportunity to alter the teaching paradigm, allow the development and adoption of teaching and learning processes that are based more on innovative teaching models, and exploit the advantages that the recording of teaching units focused on relevant content can offer. Ensuring suitable time lengths for the lectures, adding interactive materials and activities, processing complex materials in high quality, and intelligently mediating these films can help advance more effective learning and more varied teaching models that arouse interest and are more rewarding. There did not seem to be any increase in students' participatory behaviors. The majority of the students watched the video recordings for additional review, to clarify the studied concepts, or to catch up with what they had missed. It is recommended that the recorded lectures could be used as an advantageous tool to redesign teaching methods, and, in implementing the flipped classroom model, free up the time of class lectures for various interactive and collaborative activities during class.

Based on the research results, it is important to perform additional multiparticipant research that is controlled with regard to the course lecturer and course contents, to examine differences between different models for the integration of video in teaching, and to test the influence of these models on student achievement. Research of this kind can inform the formation of pedagogical models for online teaching adapted for different courses, teaching methods, and teaching and learning preferences. Additionally, lecturers manage their courses through learning management systems, so it is recommended to integrate the recorded lectures on the site accompanying the course with additional tools and activities, such as different types of assignments, forums, participatory

activities etc.

At the college level, accumulating experience in producing different models of recorded video lectures can enrich the production possibilities for lectures of this kind. Such experience can encourage and inform various kinds and formats of teaching that are adapted to the students' needs and preferences, to the lecturers' needs, and to the system's needs and constraints.

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I would like to also express my gratitude to Orly Ravid, a member of the ICT Unit, who participated in the thinking for the advancement of this field of work, and to thank Yoav Wolf, director of the Computer Unit, and his staff for their help in the implementation of this novel approach.

Appendix A. Students' attitudes and learning preferences regarding aspects of the integration of video in teaching

Dear student,

During this semester you participated in a course that was accompanied by an online course site and included online components. We would be grateful if you would devote a little time to answer the following questionnaire. Your answers will help us to respond to different learning styles and teaching needs.

Thank you for your cooperation.

The staff of the Academic and Online Teaching Computer Unit

Part A – General Questions

1. The name of the course in which you participated:
2. Age:
    a. 18-25
    b. 25-35
    c. 35-45
    d. 45-55
    e. 55-65
    f. Other

Part B – The student's learning preferences

1. How frequently did you attend the lessons?
    a. I attended all the lessons
    b. I missed 1-2 lessons
    c. I missed 3-4 lessons
    d. I missed more than 4 lessons
    e. I did not attend any of the lessons
2. How did you learn the course contents (you can choose more than one answer)?
    a. From the lectures in the class
    b. From the video recordings of the less
    c. From other materials on the course site (presentations, summaries)
    d. From printed material such as books and articles
    e. Other
3. What means did you use to study the course materials (you can choose more than one answer):
    a. Reading hard copy
    b. Desk pc
    c. Laptop
    d. Smartphone
    e. Tablet
    f. Other
4. If you watched the course video recordings, when did you usually watch them? (you can choose more than one answer):
    a. Immediately after their publication
    b. Before an exam
    c. Before an assignment
    d. I did not watch the recordings

Other

Part C – Students' attitudes regarding aspects of the integration of video in teaching

1. Activity during the course and consideration of the lessons (please grade the sentences as follows: to a large extent, to a reasonable extent, to a small extent, not at all).
    a. To what extent did you sense that you were actively activated during

the course?

b. To what extent did you invest in the course outside the learning hours in the class?

c. To what extent did you watch the video recordings of the lessons?

d. To what extent did the video recordings contribute to your understanding of the course materials?

e. To what extent did the uploading of the videos lead you to attend the lessons less often?

f. To what extent was the technical quality of the videos satisfactory?

g. To what extent did the course encourage collaborative work?

h. To what extent did you feel that you were actively involved in the course?

i. To what extent did you invest in the course beyond the time spent in lessons?

2. What is your opinion of the technical quality of videos that were included in the course? (1=very bad to 4=very good).

3. What is your opinion concerning the pedagogic quality of the videos that were included in the course? (1=very bad to 4=very good)

4. What was your personal experience concerning the use of the video for your studies without guiding questions?

5. We would be grateful to receive your opinion concerning the videos uploaded to the course site (what do you think about learning through videos, did you watch the videos on a Smartphone, what do you think is a desirable length for a video, what are your suggestions for improvement, the advantages of learning through videos etc.).

6. What in your opinion is the most appropriate way to learn this course:

    a. Online (without any face-to-face meetings at all)?

    b. Partially online (integration of class sessions and digital lessons)?

7. Which learning style do you prefer? (more than one answer can be selected)

    a. Verbal (text)

    b. Visual (pictures)

    c. Oral (audio)

    d. Movement

    e. Logical-mathematical

    f. Personal individual work

    g. Group work

8. Extent of your orientation in the course?

    a. To a large extent

    b. To a reasonable extent

    c. To a slight extent

    d. Not at all

    e. Was it easy for you to orient yourself on the course site?

    f. Was it easy for you to submit assignments?

    g. Was it easy for you to access the materials?

    h. Was it easy to react on the forum?

9. How do you have contact with the course lecturer/assistant? (more than one answer can be selected)?

a. E-mail
b. Messages system
c. Forum
d. Sms
e. Telephone
f. Individual face-to-face meeting
g. Response to assignments
h. Other

10. In your opinion, to what extent does ICT contribute to the course?
    a. To a large extent
    b. To a reasonable extent
    c. To a small extent
    d. Not at all
    e. Helps to understand materials
    f. Facilitates interaction with the lecturer
    g. Enables a sense of belonging to the group
    h. Enables easy access to materials
    i. Provides room for personal expression
    j. To what extent does the uploading of a recorded lecture on the site serve as a replacement for the lecture in the class? (1=Not at all to 4=to a large extent)
11. To what extent were you satisfied with the course? (1=not at all to 4=to a large extent)
12. What are your recommendations for the improvement of the course next year?
13. We would be grateful to receive any additional remarks, critique or suggestions.
14. If you would be interesting in being interviewed on the studied subject please add your name and phone number.