An Integrative Mixed Method Approach to Investigate the Types of Video Devices Used by Secondary School Teachers: A Jordanian Context

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ABSTRACT
Teaching pedagogy is constantly shaped by the environment and the socio-demographic background of teachers and students. Continuing technological developments enabled videos to be accessed more easily, faster, and across multiple platforms and devices. There has been a growing use of video technology for teaching in the Middle Eastern region, particularly in Jordan, which is one of the growing technological hubs in the region. However, there is very limited research on its use by teachers and students in Jordan. To fill this knowledge gap in relation to Jordan, the present study aims to investigate what kinds of devices, and how frequent, instructional videos are used for teaching in secondary school teachers in Amman city, Jordan. To address these questions, a survey was devised and 378 secondary school teachers in Amman participated. An Integrative Mixed Method study was conducted where both quantitative and qualitative methods were used. In the quantitative phase, descriptive statistics were calculated for frequency and percentage on the kinds of devices used by the teachers in relation to their gender, teaching grade and type of schools. Cross-tabulation chi-square statistical tests were then undertaken to assess whether there is a link between the frequency of video technology use and percentage of class time it occupies, time of day it is being used and the number for video titles used per academic year. In the qualitative phase, interviews with teachers were conducted and the data was analysed to investigate how the experiences of the teachers compliment quantitative data. The results of this study were then viewed through the lens of the Technology Acceptance Model framework. It was found that smartphones, laptops, and desktop computers were the most popular devices used in teaching. Most of the teachers who participated in this study, particularly female, those who teach Grade 11 and 12 and those in public schools, used these popular devices in their teaching. In relation to the frequency of use, and it was found that the teachers mostly used video technology in the morning classes for teaching but rarely used videos on a daily basis. Cross-tabulation chi-squared tests showed that there is a statistically significant relationship between the number of videos used in an academic year and the frequency of video usage.

1 Introduction
Environment and the socio-demographic background of teachers and students constantly affect pedagogy (Beyer et al., 2003). Modern computer technologies has vastly changed the way teachers and students interact, teach, and learn as well as their future prospects in terms of skills and job opportunities. Education technology was initially considered as a separate, but necessary part of pedagogy in the middle of the 20th century (Mishra & Koehler, 2006). Training teachers in technology education was not a priority until late 20th century (Cox, 2008) and it was largely maintained as a separate subject matter in teacher education programs (Graham et al.,2004).

Continuing technological developments enabled videos to be accessed more easily, faster, and across multiple platforms and devices. Videos can now be viewed on multiple devices and in multiple formats before, during, or after class hours (Ajloni, 2019). The increasing prevalence of technology in education is driving the viability and availability of online teaching and open academic resources. Video technology (VT) defined by Woolfitt (2015) as “digitally recorded content[s] containing sound and motion that can be streamed, stored or delivered live” (p. 4), is playing a role in facilitating these developments (Kleij et al., 2017). Woolfitt (2015) believes that “Education is undergoing a major shift” and that “brick-and-mortar classrooms are opening up to rich media content, subject matter experts, and to one another” (p. 5).

There has been a growing use of VT in the Middle Eastern region, particularly in Jordan – one of the growing technological hubs in the region. Unlike other Arab countries, Jordan is considered to be among the safest Arab

nations in the Middle East because it has been stable in the midst of ongoing regional turmoil (Hodges, 2015; Sylvester, 2019; Williamson, 2019). This has led to making Jordan a growing technological hub in the Middle East, with an increasing population of young people aged 15 years and younger (35%) (World Population Review [EPR], 2018). Education has consistently been a top government priority and King Abdullah II of Jordan has upgraded the quality of education in his country, ensuring that all students are capable of both leading future development and competing for the best jobs in modern knowledge economies (Ajloni, 2019). The Jordanian government drive has led to lots of educational reforms in the country, including equipping Jordanian schools with the right technological tools, aimed at improving the educational systems to meet contemporary needs.

Whilst VT is widely adopted in teaching practice in various parts of the world, it is less prevalent Jordanian schools. While the provision of Information and Communication Technology (ICT), including video technology (VT), in Jordanian schools has improved over the past few years (Abuhmaid, 2011; Alkawaldeh, 2014), educational technology (e.g., instructional video technology) in contemporary Jordan continues to face a number of challenges. This includes the problem of funding, accessibility to the right tools, limited ICT training, poor technological literacy, among others (Aloraini, 2012; Oliemat et al., 2018). The use of VT provides an array of new tools for harnessing the benefits of educational technology and improving educational productivity. These tools help in facilitating learning experiences that enhance connection with others in real time using social media, recorded devices, instant messaging, audio and video devices (Benitez & Galbraith, 2019). Technological devices such as interactive whiteboards, touch tablet screens, smartphones, personal computers, and projects, can be used in viewing and playing videos where both teachers and students converge for educational purposes. However, the use of such devices to play and view videos can be dependent on a lot of factors such as technological (e.g., lack of access to the Internet), environmental (e.g., locations that are out of reach with technology), educational (e.g., some schools only use video technologies at the tertiary levels), and socio-economic factors (e.g., lack of finance to purchase an appropriate video device for teaching and learning; some technological devices are also expensive and unaffordable by teacher from low-income backgrounds) (Ajloni, 2019).

Although access to VT is limited in Jordanian schools, instructional video technology does exist in some public and private schools in the region despite the above-mentioned challenges. Research on using different forms of VT and video devices in Jordanian classroom is relatively new and it has been limited to middle, high, and university school teachers and students, while no research yet exists for primary and pre-school pupils (e.g., Abed Al-Latif, 2015; Ajloni, 2019; Oliemat et al., 2018; Qunaibi, 2016). The adoption of VT in some Jordanian schools and its increasing use by students at home, have created the need to explore how video technologies are viewed and used among teachers. The growing trend of technology in Jordan is largely influenced by the widespread use of social media platforms in the country, although VT devices used for viewing instructional videos (e.g., IWBs, touch-screen devices, computer-assisted data projectors, etc.) are not widely available in Jordanian schools (Abuhmaid, 2011; Hamadneh & Masaeed, 2015; Oliemat et al., 2018). Despite this challenge, the number of schools using VT in their classrooms are expected to increase, according to Oliemat et al. (2018).

2 Present study

The adoption of VT in educational environments has resulted in the need to explore its functionality and applicability. There is currently limited research and studies that focus on the use of VT devices in secondary school settings (e.g., Bautista et al., 2019; Bruce, 2009; Manero et al., 2015; Marklund, 2015), particularly in the context secondary schools in Jordan (e.g., Ajloni, 2019; Ajlouni & Aljarrah, 2011). It has been reported that teachers with access to VT devices are more likely to make use of them in their teaching practice in order to elevate students' learning experiences (Abuhmaid, 2014; Al-Shboul, 2012; Alzyoudi et al., 2015; Basheti et al., 2016; Hamam et al., 2008; Khasawneh, 2015; Oliemat et al., 2018; Qudah et al., 2013).

The Jordanian Ministry of Education (MoE) has teamed up with UNICEF and private schools to initiate its Digital Schools Program. This program aims to provide students with various technological devices for their learning. As a result, the number of schools employing VT in Jordan is expected to increase dramatically in the near future (Ajloni, 2019; Ajloni & O'Toole, 2021; Oliemat et al., 2018). To capitalize on this technological shift, understanding how teachers' adaptation of educational VT's in the classroom is thus of utter importance. The present pioneering study, therefore, aims to answer the following research questions:

1. What kinds of devices are frequently used to view instructional videos in secondary school teachers in Amman city, Jordan?; and
2. How frequently do secondary school teachers in Amman city (Jordan) use video as a tool for teaching?

Amman city is the focus of this study as VT is not widely adopted by teachers in other cities of Jordan due to lack of experience with this type of technology in other cities. Another reason for focusing on Amman is because it is

the capital and most populated city in Jordan, and a growing technological hub in the Middle East (Abdallah, 2010; Assaad & Saleh, 2016; Irvine, Jaber, & Bickerton, 2018) as well as having high-speed Internet access, representation of young people and greater number of mixed gender teachers and schools and, a progressive Islamic province with freedom of worship for both Muslims and people of other faiths compared to other cities (Alzyoud et al., 2016). These features have made Amman an international city, with both English and Arabic speaking teachers from different parts of the world serving in the province.

Although it would also be worthwhile to consider the research questions in the context of primary schools, this study focuses on secondary schools instead in order to keep the scope of this study manageable. In addition, it is easier to discern the relationship between subject matter being taught and the type of video devices being used because most secondary school teachers deliver single subjects whereas primary school teachers tend to teach multiple subjects. This study may be expanded to include primary schools in the future, but the current focus is on secondary schools only.

The results of this study will be considered in the context of the Technology Acceptance Model (TAM) framework. A description of the TAM framework and how it is relevant to this study is provided in the section below.

3 Literature review

The rise in the adoption of technology in education is driving the viability and availability of online teaching and open academic resources and VT is playing a role in facilitating these developments (Fokides & Arvaniti, 2020) which has largely been influenced by technological trends and enthusiasm of people of all cultures, as well as uptake of VT and widespread access to the internet (Woolfitt, 2015). The impact of VT on teaching continues to influence pedagogy (Woolfitt, 2015).

The internet bandwidth is currently dominated by the use of videos since “globally, total internet video traffic (business and consumer, combined) will be 77% of all internet traffic in 2019, up from 59% in 2014” (Ajloni, 2019). The increasing adoption of videos is reflected in how it is used within the educational environment (Ajloni, 2019). A number of studies (e.g., Ajloni, 2019; Voogt et al., 2013) have conceptualized the integration of technology in pedagogy.

The introduction of modern computer technologies has vastly changed the way teachers interact. Before now, education technology was treated as separate but necessary to pedagogy (Mishra & Koehler, 2006). Training pre-service teachers in educational technology was not a priority until the mid-1990s and it was largely maintained as a separate course in teacher education programs (Graham, Culatta, Pratt, & West, 2004).

The shift in pedagogy to include technological literacy has led to the conceptualization of technology as a form of pedagogical competence in teaching practice (Mishra & Koehler, 2008). This involves the skills and processes required to operate particular technologies and use videos in teaching practice. These skillsets complement teacher knowledge, thus enabling the effective use of videos in educational technology.

There are barriers and limitations to adopting VT in education as it is becoming prevalent. For example, poor resources and inadequate training may cause loss of confidence in integrating VT into classroom practice. Lack of training in information technology and video-based learning (VBL) may hinder its effective use (Mustafa & Cullingford, 2008; Unal & Ozturk, 2012). In order for VT to be effective, educators need adequate training in the creative process to effectively select appropriate videos and manage them in the classroom. Other barriers to using videos in the classroom include the digital divide that might be affecting the use of VT in developing countries (Khasawneh, 2015), paucity of educational information (Bakri, 2013), and the concern that the social elements of teaching (e.g., classroom interaction, student engagement, knowledge transfer) could be swamped by technology. Financial constraints associated with VT may also influence the lack of time and insufficient infrastructure to build a vibrant, dynamic classroom environment that incorporates the environment-fit model (Joseph, 2012). Ajloni (2019) noted that the lack of teacher confidence and lack of appropriate background knowledge in educational technology can make VBL difficult to implement. Poor access to resources or limited technological experience may also hinder implementation of VBL in developing countries (Mustafa & Cullingford, 2008). Besides, Besides, VBL faces a number of challenges, for example copyright issues and the proliferation of videos from ‘wannabe’ teachers and educational video creators who practice as experts without a teaching qualification. Further studies could consider ways to implement these pedagogical processes and what they look like when using VT in teaching practice (Ajloni, 2019).

4 Video technology and acceptance – a theoretical perspective

The outcomes of this study are viewed and interpreted through the lens of the Technology Acceptance Model (TAM). The first Technology Acceptance Model (TAM) was updated by Davis et al. (1989) based on the "Theory of Reasoned Action" and "Theory of Planned Behavior" (Fishbein & Ajzen, 1975). The TAM was initially conceptualised by Davis (1989) and it postulates that the level of adoption of technology in teaching practice is related by certain perceptions including perceived usefulness (PU), perceived ease of use (PEOU), attitude towards use (AU) and behavioural intention (BI). The definition of PU is the extent to which a person believes that using a system (being VT in the context of this study) will increase the performance of a task, and PEOU is defined as the extent of a person's believe that it is effortless in using the system. The definition of BI is the "measure of the strength of one's intention to perform a specified behavior" (Davis, 1989, p. 984), whereas AU is defined as "an individual's positive or negative feeling about performing the target behavior (e.g., using a system)" (Fishbein & Ajzen, 1975, p. 216).

The TAM framework in the context of this study is diagrammatically illustrated in Figure 1. The external variables are the types of VT devices being used for teaching practice and the extent of use of the devices. Video technology devices may include smart phone or PCs etc. The extent of use refers to how often VT is used, the time of the school day it is being used, portion of the school day it is being used and the number of video titles used per year. It is expected that if the appropriate VT device is used in the right time and the right extent, the more likely PU and PEOU are positively present in both teacher and student. This would in turn lead to the positive attitudes of teacher and students (AU) towards the use of VT, subsequently leading to the intention of use (BI). This sequence of behaviour would ultimately lead to the VT as being accepted or successfully adopted by both teacher and students (actual use). Acceptance and use of VT will likely lead to an enhanced pedagogical outcome (Loera-Varela et al., 2018; Loera-Varela & Mejía, 2018). It should be noted that PEOU affects PU, which also mediates the effect of PEOU on attitude towards use (Davis et al., 1989).

This interpretation of the TAM is best illustrated with an example. If an English teacher uses a media player to screen a Shakespearean play in an appropriate frequency such as a daily use (an appropriate frequency), then this will likely result in the perception that the VT device (media player) as being useful and is easy to use. This will then lead to the change in attitude towards the device, and intention to use the device follows. The acceptance of the VT device as an effective tool for teaching and learning will thus likely eventuate. On the other hand, a teacher who screens Shakespearean plays once a week (inappropriate frequency) will unlikely generate the perception that the VT device as being useful, thus the acceptance of it as an effective tool for teaching and learning can be considered improbable.

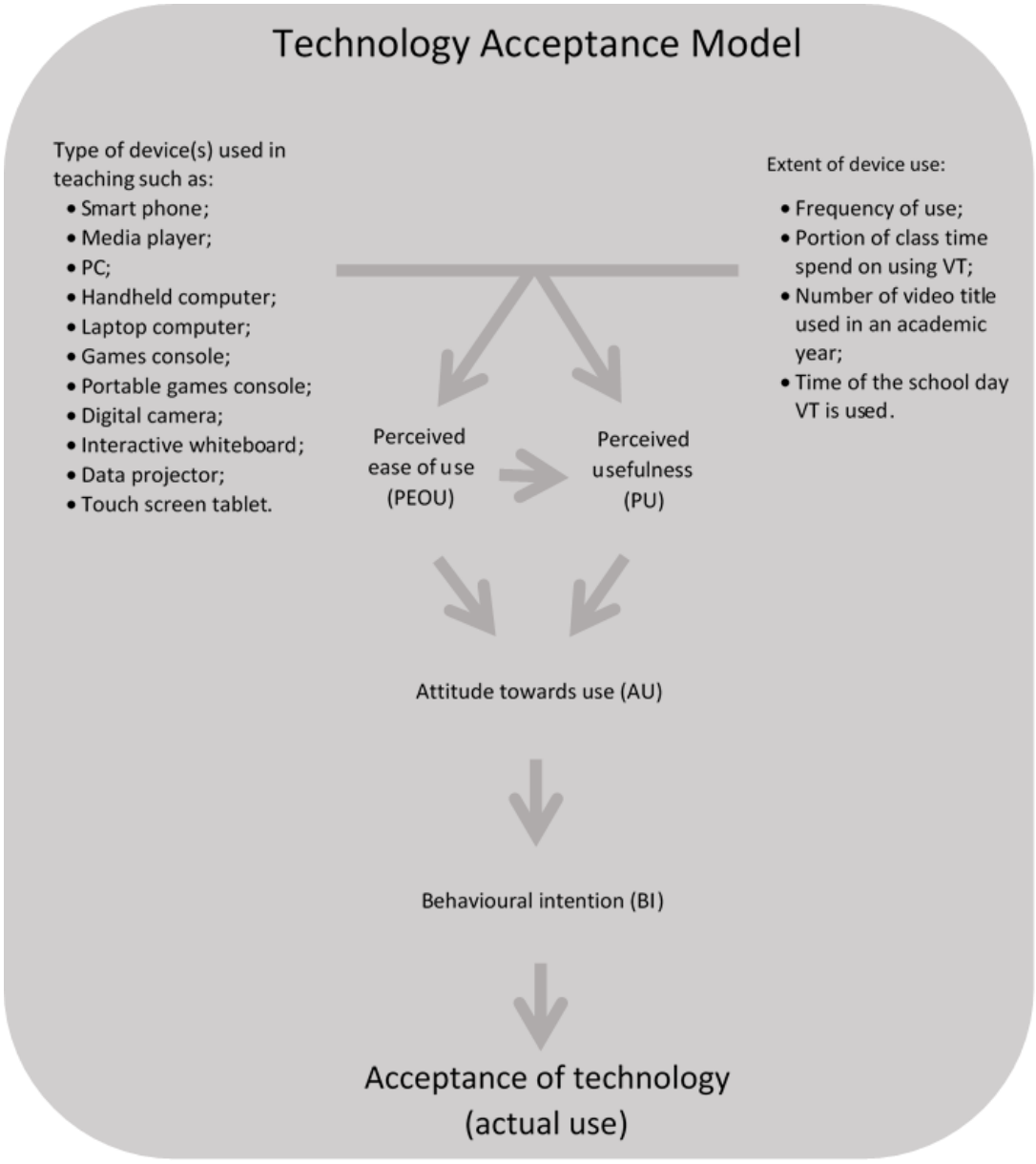

Figure 1: TAM theoretical framework in the context of this study

5 Methodology

5.1 Research design: An integrative mixed methods study

This study employed an integrative mixed methods (IMM) design by incorporating both quantitative and qualitative techniques. According to Creswell (2007), a mixed-methods research design provides a more in-depth understanding of issues being investigated that the use of either a quantitative or qualitative method alone. The IMM design may "offer the strength of confirmatory results drawn from quantitative analyses, along with explanatory descriptions as drawn from qualitative (interview) analyses" (Castro et al., 2010, p. 342).

This design was chosen to combine the quantitative and qualitative data in order to provide reliable and complementary results. The IMM technique is good for conducting "rigorous data analyses that meet scientific standards of reliable and valid measurement and analysis" (Castro et al., 2010, p. 342). For this reason, quantitative research data via surveys was utilised to provide a baseline measurement of video usage while qualitative research data via structured interviews provided a more detailed account of teacher experiences of video usage in Jordanian secondary schools. The mixed method design employed in this study enabled the triangulation of results by unifying participants' responses using quantitative and qualitative data simultaneously. The design of the integrative mixed-methods study is shown in Figure 1 below.

Figure 1: Flowchart of the integrative mixed-methods design model used in this study.

5.2 Procedures

Issues of confidentiality, anonymity and informed consent must be addressed prior to the conducting of research (Ajloni, 2019). Therefore, before conducting this study, the researcher sought approval from the relevant stakeholders including the Human Research Ethics Committee (HREC) at the University of Newcastle (with ethics approval number H-2018-0459) and the Jordanian Ministry of Education (MoE). Prior to visiting schools, the researcher was required to secure further clearance from the Amman regional directorates of the MoE prior to contacting the relevant authorities before visiting the schools.

Participation for this study was voluntary and optional, thus participants could withdraw at any time and without any adverse consequences. The Participant Information Statement (PIS) and Invitation to Participants forms included an explanation of research purpose and process; the amount of time required for data collection; the time required of participants; information on protecting participants' rights to know the nature of this study and how data and results would be used and the benefits that will result from the research. After teachers read the PIS, they were able to complete the survey.

Culturally, there is a large power gap between male and female teachers in Jordanian schools (Adely, 2004), which meant that some female teachers could be shy and reluctant to be interviewed. Hence, information from them may be incomplete or even inaccurate because they may not speak frankly or be afraid to tell the truth (Shohel et al., 2015). As a preventative measure, two research assistants (one male and one female) who are aware of such cultural barriers were recruited to handle such matters. Particularly, the female assistant obtained permission from female teachers prior to recording their interviews. The researcher's email address, phone number and the contact details of the female research assistants were available to female participants in the event that they had concerns about their participation in the study. Given the cultural values of the Jordanian society as an Islamic nation, the researcher further sought approval from families or husbands of the female teachers before face-to-face interviews with the teachers. This was undertaken with the help of the female research assistant who explained the voluntary nature of the research to the teachers. This process enabled the researcher to collect study data in two stages: stage one (survey) and stage two (interviews). It is important to note that the involvement of the research assistants did not interrupt the data collection process in anyway. They were recruited to facilitate the data collection 'on the ground' and did not play any role in running the data analysis or interpreting or writing any section of the thesis. The participation of the research assistants was voluntary and without any financial reward.

5.3 Quantitative survey

A survey was designed to assess the extent of the use of VT and the type of devices being used by teachers in Amman. Data collected include the following:

- Type of device(s) used in teaching (e.g., smart phone, PC etc);
- Teaching grade (Grade 11, Grade 12 or both);
- Gender;
- Type of school (public or private);
- Frequency of use;
- Portion of class time spend on using VT;
- Number of video title used in an academic year;
- Time of the school day VT is used.

A literature review of this subject matter has been undertaken during the development of the survey questions. The questionnaire was available in both Arabic and English because English is the first language of some of the teachers. The researcher used different methods to translate the survey from English to Arabic. First, the researcher translated an initial version to Arabic in order to make it easier for respondents to understand the questionnaire items because the majority of the teacher participants were Arabic native speakers. A professional translator, fluent in both English and Arabic, then translated from Arabic back into English. This process was very useful in identifying errors in the originally translated version (Maxwell, 1996; Mullis et al., 1996).

In terms of the language quality, the original questionnaire was devised in both English and Arabic by the researcher before being sent to four scholars both within and outside the University of Newcastle (UoN) to examine and comment on its validity. Subsequently, the researcher modified and revised the questionnaire based on this feedback. The questionnaire was administered in a paper format and completed in approximately 15 minutes.

5.4 Qualitative interviews

The second stage of the study comprised of structured face-to-face interviews to investigate the teachers' experiences in using video as a teaching tool in order to complement the survey's quantitative results.
Interviews occurred in the schools between February 2019 and May 2019 and took an average of 30 minutes with a possible five-minute break in between. The face-to-face interviews used structured questions related to the quantitative results, with interviews being audio-recorded and transcribed before analysis. The transcriptions provided the data used to interpret the teachers' use of VT in the classroom. Any notes taken in Arabic were translated into English and verified by a certified translator. The translator signed the confidentiality agreement prior to accessing the transcripts. Some interviews were in English language with teachers whose first language is in English. To maintain confidentiality, the schools included in the qualitative stage were identified as number 1 to 12. Hence, the teachers' transcripts were numbered in accordance with their schools.

The interview protocol for the teachers was developed with consideration to the trends identified from the quantitative data. Below are some examples of the interview questions:

1. What is your preferred device(s) on which to screen videos for your students? Explain why.
2. Can you give an example of your own teaching material which engages students better when presented using VT?
3. Do you use the Technology Acceptance Model (TAM) integration model when planning to teach using different type of video devices? If yes, how do you integrate the TAM model?

5.5 Participants

5.5.1 Quantitative survey stage

The survey targeted Jordanian secondary school teachers in Amman city, Jordan. Interested participants were given the opportunity to opt in and complete the survey if instructional videos were used in their teaching practice. A total of 378 teachers, from 632 interested participants had fallen into this category and completed the survey. Data collected from these participants (N=378; age mean of 37.2, *SD* = 7.9) were used for quantitative analysis.

The majority of the teachers were females (58%) with males making the remaining portion. Teachers working in public schools (64%) exceeded those in private schools (36%). Amman city has nine districts and the survey ensured that teachers from all districts were recruited. The directors of education in each of the nine districts provided names of public and private schools in the region, thus helping in the distribution of surveys to teachers in those regions. A summary of the profiles of the participants is shown in Table 1.

Table 1: Demographic characteristics of the participants (N = 378)

Variables		**Percentage**
Socio-demographic factors		
Age group	Less than 30 years	24%
	30 to <40 years	48%
	40 to <50 years	24%
	50 years or more	4%
Gender	Male	42%
	Female	58%
Geographical factors		
Teacher residential location	Rural	40%

	Urban	60%
School districts	University	13.2%
	Al-Jiza	9.3%
	Kasaba	11.4%
	Al-Quesmah	15.9%
	Al-Muwaqqar	10.3%
	Sahab	6.6%
	Um al-Basatin [Marka]	13.2%
	Na'oor	7.1%
	Wadi al-Sayr	13.0%

5.5.2 Qualitative interview stage

Qualitative data was collected through interviews from a total of 24 secondary teachers in Amman to understand their experiences of using video. The female research assistant interviewed female teachers while the researcher and the male research assistant interviewed male teachers.

Teachers from 12 secondary schools from Amman participated in the interview stage. Six were located in urban areas and the other six in rural areas. The interview sample was determined by excluding those people who had been teaching for less than one year. This is because most of these teachers have less experience in teaching practice, especially in using VT within a professional context. Therefore, their responses may not provide the substantial information needed to examine the use of VT in Jordanian secondary schools.

The remaining teachers were grouped by school. One male and one female teacher was selected from each school, with care being taken to ensure that the numbers of Grade 11 teachers matched the number of Grade 12 teachers and the number of teachers from public schools matched the number from private schools. This yielded a stratified interview sample that is representative of second secondary teachers in Amman, Jordan. The distribution of the sample used for interviews is shown in Table 2.

The respondents were coded using combinations of the letters and numbers explained in the following sentence: a male respondent would be represented as "T1-MUP1*" and a female respondent would be represented as "T2-FUP1**" in order to preserve anonymity. In this particular order, T represents teacher, M represents male, F represents female, P1 represents public school, P2 represents private school, * represents Grade 11, ** represents Grade 12, U represents schools in urban areas and R represents schools in rural areas of Amman, Jordan. Further information on the respondents for the qualitative interview stage is presented in Table 2 below.

Table 2: Interview respondents

		Amman City (12 schools)			
		Urban area		**Rural area**	
		6 urban schools Each selected school has two participants		6 rural schools Each selected school has two participants	
Type of institutions		3 public schools	3 private schools	3 public schools	3 private schools
Teacher participants		Two teachers in Grade 11 & two teachers in Grade 12 (male & female) alternately in selected region (Urban). Each urban selected school has two teacher participants (male & female) alternately		Two teachers in Grade 11 & two teachers in Grade 12 (male & female) alternately in selected region (Rural) Each rural selected school has two teacher participants (male & female) alternately	
Teachers	**Male**	3 Teachers *	3 teachers **	3 teachers **	3 teachers *
	Female	3 teachers **	3 teachers *	3 teachers *	3 teachers **

*** Grade 11**
**** Grade 12**

5.6 Data analysis

5.6.1 Quantitative survey stage

Data collected in relation to the frequency of use and the type of VT devices used by teachers was analysed to answer the research questions outlined in the *Present Study* section. The first type of analysis was tabulation of results to discern the types of VT devices being used and the extent of use. Chi-square tests were then performed on the cross-tabulation of the data to ascertain the potential link between the frequency of video device being used and (a) time of day VT is being used in teaching practice; (b) proportion of class time being delivered with VT; and (c) the number video titles used per academic year.

5.6.2 Qualitative interview stage

In the qualitative analysis, data are reviewed, synthesised and interpreted in order to explain and describe a particular phenomenon being investigated (Olafson, Feucht, & Marchand, 2013). Interview data were analysed using a deductive analytical approach, as opposed to the inductive analysis, in order to investigate how the experiences of the secondary teachers in this study amplify the experiences of video usage assessed in the quantitative stage while also identifying new patterns of ideas. The application of deductive analysis was necessary since the qualitative component of the study was designed to complement the quantitative data and themes. This approach significantly strengthens the overall survey results, thus avoiding the risk of reaching faulty conclusions (Hyde, 2000; Popper, 2014). This is true since the "adoption of formal deductive procedures can represent an important step towards assuring conviction in qualitative research findings" (Hyde, 2000, p. 82). This approach enabled reaffirmation of existing theories and quantitative results, as well as demonstrate the similarities or differences between the quantitative and qualitative data.

Data analysis of the qualitative stage was guided by the step-by-step procedures designed by Braun and Clarke (2006). These guidelines include:

1. Becoming familiar with the data;
2. Generating initial codes;
3. Searching for themes that match patterns of thoughts in the quantitative results;
4. Reviewing themes;
5. Defining and naming themes and
6. Reporting the observations from cases in the interviews.

All 24 interview transcriptions were carefully read by the researcher to familiarise himself with the data. This helped in identifying similar patterns and meanings and matching them deductively with the quantitative results as undertaken by studies such as Braun and Clarke (2006) and Saldana (2015).

6 Result

This section presents the analysis results of the collected data in relation to the two research questions outlined in the *Present Study* section, which are:

1. What kinds of devices are frequently used to view instructional videos in secondary school teachers in Amman city, Jordan?; and
2. How frequently do secondary school teachers in Amman city (Jordan) use video as a tool for teaching?

6.1 Types of video technology devices

A combination of quantitative analysis and descriptive statistics (qualitative) were utilised to answer the first research question. Quantitative analysis results revealed the distribution of the different types of VT devices used by teachers in Amman city. In general, 77% of the teachers owned the smartphones they use in the classroom compared to 26% of those who use their school smartphone devices. Female teachers reported an overall higher ownership and usage of devices compared to male teachers. Table 7.2 indicates that teachers who taught both Grade 11 and Grade 12 reported a higher level of ownership and usage of VT devices for educational purposes. Similar higher levels of video usage for educational purposes were reported by public school teachers.
Interview data suggests that these teachers have some previous experience with VT. For example,

> "In Computer Science I use videos every day. I use a laptop with a projector and microphone or my smartphone, IWBs, speakers, lights and everything" (T3-MRP1*).

> "I have good experience with video use and how to deal with different kinds of equipment. I have a good background in this area" (T3-MUP2**).

These teachers' experiences reflect those of many of the participants from the qualitative research interviews in relation to previous experience with technology as well as the variety of video devices used by teachers at secondary school students in Amman.

One interesting finding from the qualitative interviews, however, was how the teachers used their own personal devices in the classroom rather than devices provided by the schools. Some of the respondents said it was convenient for them and others mentioned the lack of VT devices in their schools. The following statements confirm this finding:

> "Sadly, we lack equipment, especially in boys' schools. Sometimes I bring my own equipment into the rooms, like a Smartphone or laptops. If I want to screen segments, I take the boys to the lab. We also have problems with electricity shortages. If I use my own equipment, I save time and try to involve every student" (T1-MUP1*).
>
> "Devices I mostly use are the IWB, data projector and also my own mobile phone. I have a cable handy if I need to attach my phone to the IWB in class. I usually use my own laptop to screen videos in the classroom. I find this easier because I can edit the segments more easily with programs that I am familiar with" (T2-MUP2*).
>
> "I use my own laptop, smartphone, lights, microphone, and portable camera and tripod in class and sometimes I assign students tasks in class like carrying the camera while I explain things…I have my own projector and I'm continually trying to improve the equipment. I have a cable to connect my smartphone with the projector and screen videos this way. This is expensive though" (T1-MUP1*).
>
> "Sometimes I use my own laptop, as there is a projector in the lab or students bring in their iPads, smartphones, speakers, microphones and cables. These mostly come from me or from the students - not from the school" (T1-MUP1**).

The following sections explore in further details the different devices owned and used by the teachers in relation to their gender (male vs. female), teaching grades (Grade 11, Grade 12, and both 11 and 12) and school type (public vs. private).

6.2 Gender

Study results show that female teachers used their own devices more often compared to their male counterparts (see Table 3 below). It was found that 58.1% of the participants who owned smartphones (mobile phones) were female, while male teachers make up the remaining 41.9%. Just below half (49.5%) who used smart phones for teaching were females, with males making the other half (50.5%). In other words, more female teachers owned smartphones than male teachers, but male teachers used them more in class proportionally. When gender is combined, a total of 76.9% of the teachers used their own smartphones in their teaching practice compared to only 25.7% who used school provided smartphones.

With regard to the use of media players such as iPods or MP3 players, 58.7% of female teachers reported ownership of these devices with a 46.5% usage rate while male teachers reported an ownership rate of 41.3%, but with a higher usage rate of 53.5%. As with the use of smartphones (mobile phones), male teachers utilized these media players more than female teachers.

In the case of personal computers (PCs), female teachers own and use PCs for teaching at the same rate (both at 53.6%) as male teachers, who however report a lower total percentage (46.4%). Female teachers report a higher rate of ownership of handheld computers such as PDAs and Blackberries (62.9%) compared to their usage (57.6%) while male teachers' ownership (37.1%) and usage (42.4%) are lower overall, though male teachers report using the devices more in class.

The reporting of ownership and usage of laptop computers shows some interesting data. More female teachers (60.1%) reported owning a laptop compared to male teachers (39.9%), and a higher percentage of female teachers (55.9%) reported using them for teaching duties compared to their male counterparts (44.1%).

Table 3: Types of devices male and female teachers used and owned to view instructional videos

Video Devices	**Gender**					
	Male		**Female**		**Total N = 378**	
	Own ***N (%)***	***Use*** ***N (%)***	***Own*** ***N (%)***	***Use*** ***N (%)***	***Own*** ***N (%)***	***Use*** ***N (%)***
Smartphone (Mobile phone)	122 (41.9%)	49 (50.5%)	169 (58.1%)	48 (49.5%)	291 (76.9%)	97 (25.7%)
Media Player (e.g., iPod, mp3 player)	38 (41.3%)	46 (53.5%)	54 (58.7%)	40 (46.5%)	92 (24.3%)	86 (22.8%)
Personal Computer (e.g., Mac, PC)	83 (46.4%)	39 (46.4%)	96 (53.6%)	45 (53.6%)	179 (47.3%)	84 (22.2%)
Handheld Computer (e.g., PDA, Blackberry, Palmtop)	39 (37.1%)	28 (42.4%)	66 (62.9%)	38 (57.6%)	105 (27.8%)	66 (17.5%)
Laptop computer	69 (39.9%)	45 (44.1%)	104 (60.1%)	57 (55.9%)	173 (45.8%)	102 (26.9%)
Games Console (e.g., Xbox, PlayStation, Nintendo)	23 (31.1%)	34 (53.1%)	51 (68.9%)	30 (46.9%)	74 (19.6%)	64 (17%)
Portable Games Console	17 (37.0%)	22 (40.0%)	29 (63.0%)	33 (60.0%)	46 (12.2%)	55 (14.6%)
Digital Camera	19 (30.2%)	31 (35.6%)	44 (69.8%)	56 (64.4%)	63 (16.7%)	87 (23%)
Interactive White Board (IWB)	35 (35.4%)	56 (39.2%)	64 (64.6%)	87 (60.8%)	99 (26.2%)	143 (37.8%)
Data Projector (DataShows)	36 (35.6%)	61 (50.0%)	65 (64.4%)	61 (50.0%)	101 (26.7%)	122 (32.3%)
Touch Screen tablet e.g., iPad	29 (38.7%)	53 (55.8%)	46 (61.3%)	42 (44.2%)	75 (19.8%)	95 (25.1%)
Other(s) (please specify)	14 (60.9%)	16 (51.6%)	9 (39.1%)	15 (48.4%)	23 (6.1%)	31 (8.2%)

Gaming devices such as Xbox, PlayStation or Nintendo are emerging as educational tools, with female teachers reporting a higher level of ownership of these devices (68.9%) compared to their male counterparts (31.1%). However, the rates of usage of these devices for teaching purposes were quite different with only 46.9% of female teachers reporting using them compared with 53.1% of the male teachers.

Teachers were asked about their usage of portable game consoles in their educational practice, which could include accessing games via mobile phones or tablet devices (Huizenga, Admiraal, Akkerman, & Dam, 2009; O'Rourke, Main, & Ellis, 2013; Rapeepisarn, Ponghankae, Wong, & Fung, 2008; Zaranis, Kalogiannakis, & Papadakis, 2013). Sixty-three percent of female teachers reported ownership of such a device and a usage rate of 60.0%. However, the percentages of male teachers were much lower, with 37.0% of them owning such a device and 40.0% reporting using them in their teaching practice.

With regard to the use of digital cameras as part of teaching practice, a significantly higher percentage of female teachers (69.8%) reported owning such a camera compared to a much lower percentage of male teachers (30.2%). Usage of digital cameras between both genders reflected this also with 64.4% of female teachers utilizing digital cameras in classroom teaching compared to 35.6% of their male counterparts.

IWBs have also become increasingly popular in modern classroom settings. Female teachers report a higher level of access to IWBs (64.6%) compared to male teachers (35.4%) and their usage of IWBs also shows a big difference with 60.8% of female teachers making use of this teaching resource compared with 39.2% of male teachers.

Data Projectors are commonly called Data Show in Jordanian schools (Gajria, 2007). While 64% of female teachers' report access to DataShow technology, a smaller percentage (35.6%) of male teachers report similar access. However, the usage of DataShow technology in the classroom for both genders is the same, at 50.0%. With regard to the use of touch screen tablets for educational purposes, 61.3% of female teachers report owning such a device compared to 38.7% of male teachers. In terms of classroom usage, however, a higher percentage of male teachers (55.8%) report using such a device for teaching compared to 44.2% of female teachers.

Teachers also described many other video devices that they own or use in their classroom practice. Examples of devices not already mentioned may include digital watches (e.g., Apple Watch or bracelets) with online connectivity. A relatively high percentage of male teachers (60.9%) reported owning such a device compared with only 39.1% of female teachers. In terms of using these devices in class, usage was distributed more evenly with 51.6% of male teachers reporting using such tools compared with 48.4% of the female teachers.

In summary, it was found that female teachers' ownership of, access to and use of VT was higher than that of male teachers. Significant differences exist with the use of digital cameras and IWBs, with female teachers accessing and using these more frequently than their male counterparts. The research also shows that PC ownership and usage for educational purposes among both male and female teachers were quite high.

6.3 Teaching grades

Grade 11 and 12 teachers were surveyed about the kinds of devices that they both owned and used in their classroom settings to view videos in their teaching practice with the results summarised in Table 4. The results show that those teaching both Grades 11 and 12 used video devices more than other groups of teachers. The highest percentage of video devices owned and used by the teachers in the classroom for teaching are IWB (Own: 76.2%, Use: 59.5%), media players (e.g., iPod, MP3 player) (Own: 73.3%, Use: 73.5%) and handheld computer (Own: 72.9%, Use: 58.3%).

In terms of teachers who used smartphones, results show that those teaching both Grades 11 and 12 owned more smartphone devices (64.7%) and were more likely use Smartphones in class (79.4%) compared to those teaching Grade 11 only (25.2% and 12.4%, respectively) and Grade 12 only (10.1% and 8.2%, respectively).

With regards to media players such as iPods or MP3 players, 17.4% of Grade 11-only teachers reported owning such a device, with 20.7% using one for teaching. Grade 12-only teachers reported ownership at 9.3% and actual usage of the device at 6.0%. For teachers who taught both Grade 11 and 12, the percentages were distributed more evenly, with 73.3% reporting owning a media player and 73.5% utilizing one in their teaching.

In the case of personal computers (PCs), Grade 11-only teachers recorded an ownership level of 25.2% and a similar classroom usage level of 23.6%. Grade 12-only teachers reported a PC ownership level of 16.8% as well as an educational usage rate of 15.3%. Teachers of both Grade 11 and 12 reported a PC ownership level of 58.1% and a slightly higher educational usage rate of 61.1%.

In relation to the ownership and usage of handheld computers such as PDAs, Blackberries and Palmtops, teachers of Grade 11-only reported an ownership level of 18.8% but a higher educational usage level of 33.3%. Of the Grade 12-only teachers, the percentage were relatively low with ownership reported at 8.3% and for educational usage purposes at the same level of 8.3%. Teachers who taught both Grade 11 and 12 reported a handheld computer ownership level of 72.9% but only 58.3% used these devices for their classroom teaching.

Table 4: Types of devices teachers in Grade 11, 12, and both used and owned to view instructional videos

Video Devices	**Teaching Grades**							
	Grade 11		**Grade 12**		**Both 11 & 12**		**Total N = 378**	
	Own N (%)	***Use N (%)***	***Own N (%)***	***Use N (%)***	***Own N (%)***	***Use N (%)***	***Own N (%)***	***Use N (%)***
Smartphone (Mobile phone)	65 (25.2%)	12 (12.4%)	26 (10.1%)	8 (8.2%)	167 (64.7%)	77 (79.4%)	258 (68.3%)	97 (25.7%)
Media Player (e.g., iPod, mp3 player)	15 (17.4%)	17 (20.7%)	8 (9.3%)	5 (6.0%)	63 (73.3%)	61 (73.5%)	86 (22.8%)	83 (21.9%)
Personal Computer (e.g., Mac, PC)	39 (25.2%)	17 (23.6%)	26 (16.8%)	11 (15.3%)	90 (58.1%)	44 (61.1%)	155 (41.0%)	72 (19.0%)
Handheld Computer (e.g., PDA, Blackberry, Palmtop)	18 (18.8%)	20 (33.3%)	8 (8.3%)	5 (8.3%)	70 (72.9%)	35 (58.3%)	96 (25.4%)	60 (15.9%)
Laptop computer	36 (24.2%)	22 (24.4%)	14 (9.4%)	8 (8.9%)	99 (66.4%)	60 (66.7%)	149 (39.4%)	90 (23.8%)

Games Console (e.g., Xbox, PlayStation, Nintendo)	18 (25.4%)	28 (43.8%)	5 (7.0%)	8 (12.5%)	48 (67.6%)	28 (43.8%)	71 (18.8%)	64 (16.9%)
Portable Games Console	12 (26.1%)	28 (50.9%)	5 (10.9%)	2 (3.6%)	29 (63.0%)	25 (45.5%)	46 (12.2%)	55 (14.6%)
Digital Camera	15 (23.8%)	28 (34.6%)	8 (12.7%)	5 (6.2%)	40 (63.5%)	48 (59.3%)	63 (16.7%)	81 (21.4%)
Interactive White Board (IWB)	9 (10.7%)	36 (31.0%)	11 (13.1%)	11 (9.5%)	64 (76.2%)	69 (59.5%)	84 (22.2%)	116 (30.7%)
Data Projector (DataShows)	19 (20.0%)	27 (26.0%)	11 (11.6%)	11 (10.6%)	65 (68.4%)	66 (63.5%)	95 (25.1%)	104 (27.5%)
Touch Screen tablet e.g., iPad	13 (18.8%)	22 (25.6%)	8 (11.6%)	14 (16.3%)	48 (69.6%)	50 (58.1%)	69 (18.3%)	86 (22.8%)
Other(s) (please specify)	6 (26.1%)	3 (9.7%)	3 (13.0%)	9 (29.0%)	14 (60.9%)	19 (61.3%)	23 (6.1%)	31 (8.2%)

Grade 11-only teachers had similar levels of ownership of laptops (24.2%) and educational usage (24.4%) whilst Grade 12-only teachers reported ownership of 9.4% and usage of 8.9%. A greater difference existed for teachers of both Grade 11 and 12 classes. They revealed that 66.4% owned a PC and 66.7% used one as part of their educational practice.

Analysis was also performed on Gaming devices such as Xbox, PlayStation or Nintendo in their teaching practice. In the Grade 11-only cohort, 25.4% revealed that they owned such a gaming device, but a larger percentage (43.8%) reported using one in their classes. For the Grade 12-only cohort, 7.0% reported owning one of these devices with 12.5% reporting that they had used one in their classroom. For teachers who have both Grade 11 and 12 classes, a larger percentage (67.6%) reported owning a gaming device and 43.8% of the teachers had used one as part of their teaching practice.

Teachers were also surveyed about using portable game consoles in their teaching practice. These could include devices that allowed access to gaming via mobile phones or tablet devices (Carr, 2012; Hill, 2011; Huizenga et al., 2009). It appears that 26.1% of Grade 11-only teachers reported owning a gaming device while a larger 50.9% of this cohort had used such a device for teaching. Of the Grade 12-only cohort, 10.9% reported owning a gaming device with only 3.6% having used one for their teaching practice. Of the teachers who taught both Grade 11 and 12 classes, 63.0% reported owning a gaming console with 45.5% of the participants having used one in their teaching practice.

With regards to digital cameras, 23.8% of Grade 11-only teachers owned a digital camera, although 34.6% had used one for teaching purposes. Furthermore, 12.7% of Grade 12-only teachers owned a camera but only 6.2% had utilized one in the classroom. Of the teachers who taught both Grades 11 and 12, the numbers were higher. For example, 63.5% owned a digital camera whereas 59.3% of them had used one in their classroom.

In addition, Grade 11-only teachers reported owning (10.7%) and using (31.0%) IWBs, while 13.1% of Grade 12 teachers reported owing their own IWB devices and 9.5% reported using them in the classroom. Of teachers who taught both Grade 11 and 12, 76.2% reported having owned an IWB for personal purposes but only 59.5% reported that they had used one for their teaching practice.

Of the Grade 11-only teachers surveyed, 20.0% reported owing a DataShow while 26.0% indicated using one for their teaching practice. For the Grade 12-only teaching cohort, 11.6% reported owning a DataShow with 10.6% having used it for teaching. Of the Grade 11 and 12 teaching cohort, percentages were much higher with 68.4% reporting ownership of DataShow and 63.5% using the device in their classroom (see Table 4 above).

With regards to touch screen tablets, 18.8% of Grade 11-only teachers reported owning such a device with 25.6% having used one for teaching. For the Grade 12-only teaching cohort, 11.6% owned a tablet and 16.3% had used one in the classroom for teaching. Of the Grade 11 and 12 teaching cohort, 69.9% owned a tablet device with 58.1% declaring that they used one for teaching.

The researcher also surveyed teachers with regards to other video devices (e.g., digital watch or bracelets). Of the Grade 11-only teachers, 26.1% reported that they owned a similar device while 9.7% reported using one for teaching. Of the Grade12-only cohort, 13.0% owned other video devices while 29.0% reported using one for

teaching. Of the teachers who taught both Grade 11 and 12, 60.9% owned other video devices, similar with those (61.3%) who used one in class.

In summary, teachers who taught both Grade 11 and 12 students reported an overall higher level of video device ownership for personal purposes and usage of the devices in their teaching practice compared to those who taught Grade 11 and Grade 12 students separately. Interestingly, for most the devices considered, the ownership rate is higher than the usage rate.

6.4 School type

Results of this study in relation to public and private school are summarised in Table 5. In Jordan, the educational system comprises both public and private schools (Taani, 1997). Public schools receive funding from the government and other international funding agencies (e.g., Global Education Initiative, UNICEF, USAID, and UNESCO). Private schools, on the other hand, may be Islamic Schools, International schools, or other religious schools; specifically, Christian schools (e.g., Alkhawaldeh & Menchaca, 2014; Hodges, 2015). The differences in funding arrangement may be important when interpreting the results of this study in relation to the differences between public and private schools.

In terms of Smartphone ownership and usage by teachers employed in schools in and around Jordan's capital city Amman, it was found that 64.3% of public school teachers owned a Smartphone compared to only 35.7% of private school teachers. In respect to Smartphone usage, 77.3% of public school teachers reported using their Smartphones for their teaching practice compared with 22.7% of private school teachers who used for the same purpose (Phan, Jardina, Hoyle, & Chaparro, 2016). With regard to media players such as iPods or MP3, public school teachers reported higher ownership (59.8%) and usage (60.5%) overall compared with private school teachers who reported ownership of 40.2% and 39.5% usage in their teaching.

Table 5: Types of video technology devices owned and used in private and public schools

Video Devices	**School Type**					
	Public		**Private**		**Total N = 378**	
	Own N (%)	***Use N (%)***	***Own N (%)***	***Use N (%)***	***Own N (%)***	***Use N (%)***
Smartphone (Mobile phone)	187 (64.3%)	75 (77.3%)	104 (35.7%)	22 (22.7%)	291 (76.9%)	97 (25.7%)
Media Player (e.g., iPod, mp3 player)	55 (59.8%)	52 (60.5%)	37 (40.2%)	34 (39.5%)	92 (24.3%)	86 (22.8%)
Personal Computer (e.g., Mac, PC)	104 (58.1%)	56 (66.7%)	75 (41.9%)	28 (33.3%)	179 (47.4)	84 (22.2%)
Handheld Computer (e.g., PDA, Blackberry, Palmtop)	65 (61.9%)	40 (60.6%)	40 (38.1%)	26 (39.4%)	105 (27.7)	66 (17.5%)
Laptop computer	99 (57.2%)	63 (61.8%)	74 (42.8%)	39 (38.2%)	173 (45.8%)	102 (26.9%)
Games Console (e.g., Xbox, PlayStation, Nintendo)	45 (60.8%)	36 (56.3%)	29 (39.2%)	28 (43.8%)	74 (19.6%)	64 (16.9%)
Portable Games Console	29 (63.0%)	34 (61.8%)	17 (37.0%)	21 (38.2%)	46 (12.2%)	55 (14.6%)
Digital Camera	34 (54.0%)	49 (56.3%)	29 (46.0%)	38 (43.7%)	63 (16.7%)	87 (23.0%)
Interactive White Board (IWB)	53 (53.5%)	85 (59.4%)	46 (46.5%)	58 (40.6%)	99 (26.2%)	143 (37.9%)
Data Projector (DataShows)	64 (63.4%)	75 (61.5%)	37 (36.6%)	47 (38.5%)	101 (26.7%)	122 (32.3%)
Touch Screen tablet e.g., iPad	44 (58.7%)	57 (60.0%)	31 (41.3%)	38 (40.0%)	75 (19.8%)	95 (25.1%)
Other(s) (please specify)	20 (87.0%)	18 (58.1%)	3 (13.0%)	13 (41.9%)	23 (6.1%)	31 (8.2%)

Teachers were surveyed about Personal computers (PC or Mac) and again, the data show that public school teachers reported higher ownership and usage of PCs. For example, 58.1% of public school teachers reported

owning a PC and 66.7% used one in their teaching practice. Among the private school teachers, 41.9% reported ownership of a PC and 33.3% reported using one as part of their teaching practice. Teachers were also asked about their ownership and usage of handheld computer devices such as PDAs, Blackberries and Palmtops. The results show that 62% of public school teachers owned such a device compared to 38% of private school teachers. In terms of using handheld computer devices for their teaching practice, a similar number of public school teachers (61.9%) reported this type of usage compared with 38.1% of private school teachers. In terms of laptop computer ownership and usage, data collected revealed that both public and private school teachers had similar levels of laptop ownership (57.2%) while usage of this device for teaching practice was much higher for public school teachers (61.8%) compared to private school teachers who owned (42.8%) and used (38.2%) laptop devices.

Computer and online games are beginning to emerge as important tools in the educational sphere, for example for teaching English vocabulary (Muhanna, 2012). With regards to teachers' ownership of game consoles, 60.8% of public school teachers reported owning such a device compare with 39.2% of private school teachers. In terms of usage of game consoles for educational purposes, 56.3% of public school teachers were in this category compared with 43.8% of teachers from the private sector. Teachers were also quizzed about portable game consoles with the data showing that 63.0% of public school teachers own one of these devices while a similar percentage have used 61.8% them for teaching. Among private school teachers, the levels are lower with 37.0% reporting owning portable game consoles and a similar percentage (38.2%) using one among those in public schools.

Teachers were asked about ownership and use of digital cameras, and about 54.0% of public school teachers reported owning a digital camera compared with the lower number of private school teachers (46.0%). In terms of using these cameras for educational purposes, the levels were quite similar with 56.3% of teachers from the public sector doing so compared with only 43.7% from the private sector. In terms of ownership and usage of IWBs, a greater number of public school teachers reported owning the device (53.5%) compared to teachers in private school sector (46.5%). Similarly, a greater percentage of public school teachers (59.4%) used IWBs in their teaching practice in comparison to those in private schools (40.6%).

With regard to DataShows, levels of ownership (63.4%) and usage (61.5%) were very similar for most public school teachers. On the other hand, a lesser number of teachers (36.6%) in the private school sector owned DataShows while the number of teachers (38.5%) who use this tool for teaching purposes was similar to those in the public school sector.

In respect to the ownership and usage of Touchscreen tablets, the following information emerged: 58.7% of public school teachers owned such a device compared with only 41.3% of private school teachers. In terms of usage for educational purposes, a majority of the public school teachers (60.0%) used tablets for teaching-related purposes compared to those in private school sector (40.0%). The final question surveyed teachers on their use of other video devices, with data showing that teachers in public schools were greater (87.0%) owners of other digital devices compared with only 13.0% of those who owned similar devices in the private school sector. In answer to the question of whether they used such devices for educational purposes, a similar pattern emerges, with 58.1% of public teachers doing so, compared to only 41.9% of participating teachers from private schools.

6.5 Frequency of video use

The frequency of teachers' use of video as a teaching tool were explored by factoring (a) the usage of videos in the classroom based on daily, weekly, monthly and occasional periods; (b) times of school day the video is used; (c) percentage of class time allocated to video usage; and (d) number of video titles watched. Results are summarised in Figure 2.

In terms of the usage of video as a teaching tool, most teachers used video weekly (31.2%) then daily (16.7%), monthly (18.8%), and others used it occasionally (27.8%) and at 'Other' periods (5.6%). It is possible that using videos weekly was strategic since that would keep the students more engaged and less bored compared to daily use (which might be exhausting and less exciting due to over-utilisation). This is consistent with some studies which have reported on the negative effect of cognitive overload associated with teaching practice, where the likelihood of teachers giving students too much learning information (e.g., via VT) may tend to result in them being unable to process the surge of learning information (eg. Paolo et al., 2017). On the other hand, using videos in the classroom less frequently (eg. monthly) might limit the coverage of the school curriculum because of the less time and excitement both students and teachers invest in the videos. Students may thus be less committed to this kind of learning and are less likely to recall the content due to the time gap between viewings.

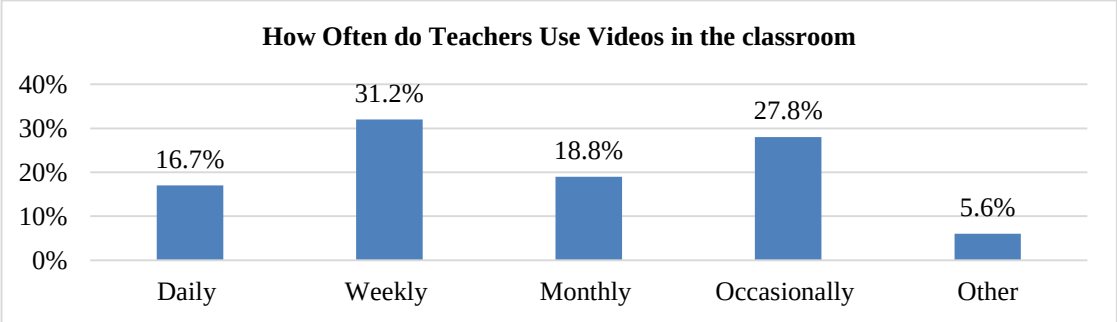

Figure 2: Frequency of video use

Approximately half the teachers (47.9%) used videos during the morning classes, which is more than those screening them around midday (38.6%). Only a few of the teachers (13.5%) used video for afternoon sessions, partly because students might be less engaged at this time of day (see Figure 3 below). The higher frequency of morning usage of videos for teaching is expected since students' concentration levels during the morning are better than later in the day (Allison, 2015). This is shown by the consistency of video usage for different times of the day: morning (47.9%), midday (38.6%) and afternoon (13.5%). Therefore, the earlier the usage of video in the classroom, the better results for both students and teachers.

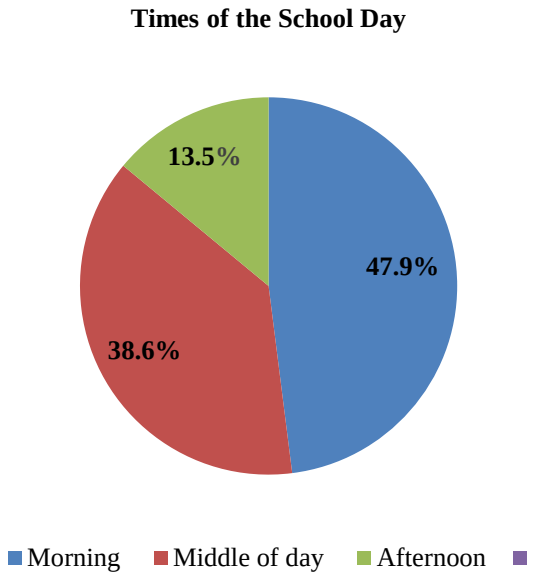

Figure 3: Times of the school day for screening videos

The researcher also assessed the percentage of class time allocated to the use of video as a teaching tool and results indicate that about 46.6% of the teachers commit less than 25% of class time to using video (see Figure 4). This is not surprising given that video usage during classroom hours might not be common in Jordan, as only a dozen of these teachers (N=12, 3.2%) teach with video for 75% of class time. Those who indicated using about 25% and 50% of their time are clearly just 11.4% and 16.1% teachers respectively, while teachers who watched video for 100% of the classroom time is 22.8%. These percentages are not significantly close to those who allocate less than 25% of their time to teaching with video. This result may suggest that using video is not yet common. Nevertheless, it also shows that these teachers prefer assigning short periods of class time to viewing videos rather than devoting more time to video-based tutorials. Perhaps this is because viewing videos for a shorter period engages the students better than bingeing on it for too long, and thereby affecting students' concentration levels negatively (Keddie, 2014; Selvarajan, 2018). The accounts of the teachers during the qualitative interviews confirm how the teachers used VT in their classrooms, as shown below:

> "I have used video equipment once a month in the past three months" (T2-MUP2*).

> "We use it [video] in Math at the start as an introduction to the lesson. I feel that the students get engaged with the content better this way" (T1-MRP1*).

"I like to let them watch a video before anything is explained from the text, maybe 10-15-minute segments. Then I explain from the books and ask for questions. This way they grasp things quickly, understand better and we save time" (T3-MRP1*).

"I divided up the content into six segments to watch it over six lessons" (T3-MUP2*).

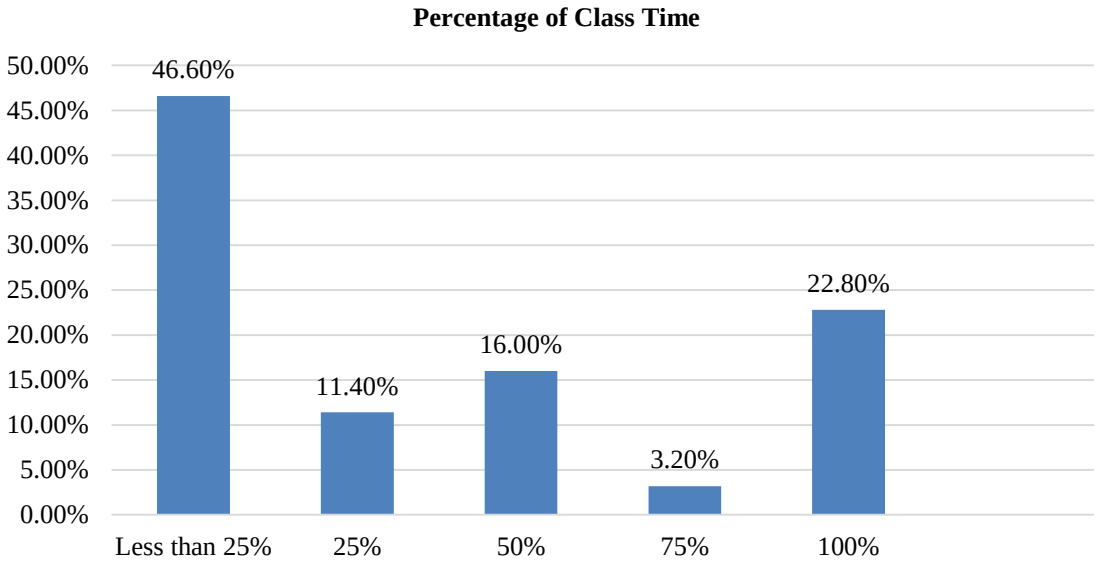

Figure 4: Percentage of time allocated to watching educational videos with students in the classroom

In order to understand the frequency of teachers' use of video in the classroom, the number of video titles watched or played by the teachers in the classroom was considered. Overall, 75.9% of teachers indicate watching 1 to 20 video titles with their students for learning purposes compared to a fraction of 17.5% who watch 21 to 50 video titles. It also reported that 5.7% and 1% who watch video title 51 to 90 and over 90 videos respectively (see Figure 5). This result still shows that even though teachers are tapping into the world of ICT to improve their teaching, only a small percentage of time is dedicated to using video in Amman city. This might explain why they allocate less than 25% of their class time watching videos, and this percentage gives an idea of the number of video titles watched by the teachers. If the percentage of time increased, this might translate to more video titles being used for classroom teaching.

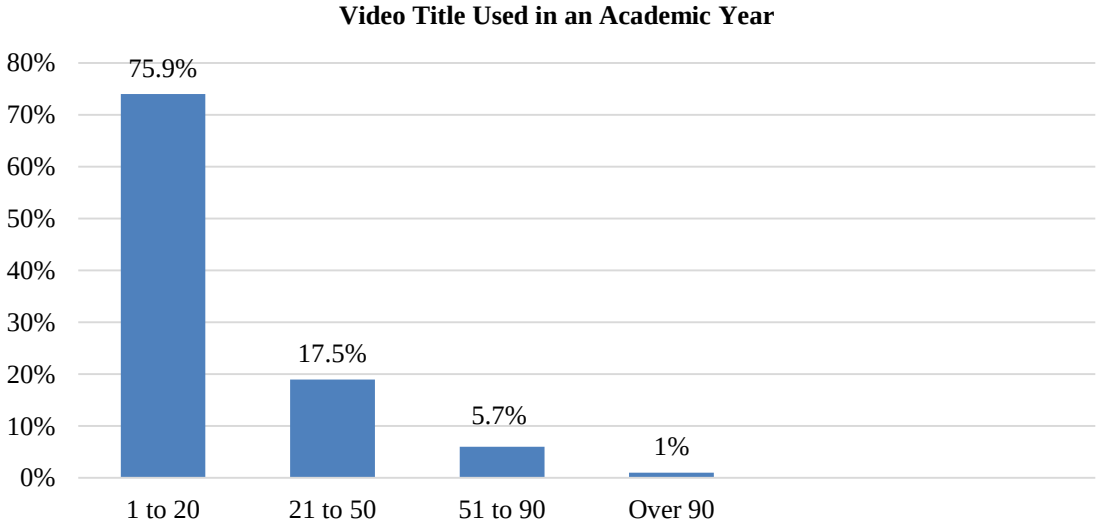

Figure 5: Video titles used in an academic year

6.6 Cross-tabulation of the frequency of teachers' video usage

Finally, a cross-tabulation of the frequency of teachers' video usage was calculated to evaluate whether there are statistical associations with time-of-day video is screened in class, proportion of class time video is played and the

number of video titles screened in an academic year. Cross-tabulations were analysed using a Chi-square goodness of fit test, and the results are summarised in
Table **6** below.

Overall, the results show that there is a statistically significant relationship between the number of videos used in an academic year and the frequency of the video usage (based on daily, weekly, monthly, and occasional periodic usages), χ^2 (df = 12) = 103.56, $p < 0.01$. There was no significant relationship between the frequency of video usage and the times of the day when the videos are often used with a p-value of .27, and the percentage of class time allocated to teaching with video, which showed a p-value of 0.28. Significance was only determined for values less than .05, hence both times of the day that videos are used, and the percentage of class time allocated to video usage do not significantly correlate with the frequency to which video is used in the classroom. On the other hand, the frequency of video usage was found to have a statistically significant correlation with the number of video titles used in an academic year.

Table 6: Cross-tabulation results for the frequency of teachers' use of videos

	Daily	**Weekly**	**Monthly**	**Occasionally**	**Total**	***df***	χ^2	***P* value**
Times of school day						6	7.59	.27
Morning	12	29	26	36	103			
Middle of the Day	21	25	14	23	83			
Afternoon	5	10	6	8	29			
Percentage of class time						16	18.47	.28
Less than 25%	27	61	37	45	176			
25%	8	15	5	11	43			
50%	12	12	14	20	61			
75%	0	3	3	6	12			
100%	16	27	12	23	86			
Number of Video Titles						12	103.56	.01
1 to 20	22	54	60	91	239			
21 to 50	14	35	3	6	58			
51 to 90	12	6	0	0	18			
Over 90	0	3	0	0	3			

7 Discussion

7.1 Type of video technology devices used

The results summarised in Table 3 through Table 5 suggest that teachers used various VT devices to enhance their teaching experience in Amman city. One interesting finding from the interviews was that the teachers used their own personal devices to enhance their teaching practice due to the limited technologies at their schools. T1-MUP1*, for example, in his interview mentioned that this lack of VT in Jordanian secondary schools was prevalent in "boys' schools", resulting in him "bring[ing] [his] own equipment into the rooms, like a smartphone or laptops." Interestingly, female teachers used even more of their own personal devices than their male counterparts, and this might mean that they were more knowledgeable with technology than male teachers. The devices mostly used by the female teachers for teaching, based on the quantitative results, were smartphones, personal computers, and laptops.

> "I have a cable handy if I need to attach my phone to the Interactive Whiteboards (IWBs) in class… [and] usually use my own laptop to screen videos in the classroom" (T1-FUP1**)

> "I use my own laptop, smartphone, lights, microphone, and portable camera and tripod in class…I have a cable to connect my smartphone with the projector and screen videos this way" (T2-MUP2*)

> "Sometimes I use my own laptop" (T1-MUP1**).

Results from the quantitative analysis also corroborate findings in the qualitative interviews, with these teachers identifying these three mobile devices as the most relevant for their VT in teaching. Smartphones, personal computers and laptops were the most frequently used VT devices in these schools regardless of the teachers' gender, school types and teaching grades. These three devices emerged as the most effective 'mobile devices' for

teaching and improving students' learning performances in a recent meta-analysis (Sung, Chang, & Liu, 2016). T2-MUP2* noted that even though he uses his smartphone, laptop and computer in the classroom for teaching, "this is expensive though." These teachers used other electronic teaching devices, such as portable games console, digital cameras and IWBs, less often.

There are other reasons why the teachers might have found it easier to use their smart phones, laptops and personal computers than other devices. One reason is Internet access (Brown, 2016, 2018; Burston, 2013; Hockly, 2013). These three devices can easily be used to access the Internet compared to other devices. With smart phones, for example, teachers can easily connect their IWB to their phone using a USB cable. If teachers need to make educational recordings, they will probably use their camera phone (e.g., Brown, 2016, 2018; Burston, 2013; Ferry, 2009; Gromik, 2009; Kim et al., 2013; Lu, 2008).

Another potential reason is the convenience of these devices. Smart phones, laptops and tablets are mobile devices that can be used by teachers at any given place, thus making it easy to use them for teaching and learning (Brown, 2016, 2018; Burston, 2013; Chuang, 2009; Hockly, 2013; Moura & Carvalho, 2008). This might explain why the teachers frequently used these devices in their classrooms. Perhaps, as an incentive, teachers should be provided with a teaching tool kit that contains a smart phone, laptop, and personal computer, since they are frequently used in teaching. Such an incentive should also come with a paid internet subscription to make it easier for teachers to access the Internet when developing their content and designing pedagogical methods that are VT (Brabazon, 2002; Levy, 2000; Schofield & Davidson, 2017; Warlick, 2009).

Teachers in public schools are more likely to use VT in the classroom, and most used their own personal smartphone (64%) and computer (58%) devices in the process. This may suggest that the MoE should put more effort on how to integrate VT in public schools by allocating appropriate funding to the schools, supplying video devices or teaching tool kits (with laptops, smartphones, and personal computers), and providing training sessions for teachers. Supplying teachers with necessary tool kits should also come with a paid internet subscription to make it easier for them to access the Internet when developing their content and designing pedagogical methods that are VT.

7.2 Frequency of use and time-of-day

It was found that most of these teachers use VT on a weekly basis, or occasionally, rather than daily. This appears sensible since selecting a video takes time and creating one is quite a laborious task. Besides, most teachers may be preoccupied developing their teaching and may not have sufficient time to prepare videos for daily screening. Technological literacy might reduce the amount of time spent in integrating technology into learning (Jenson & Droumeva, 2017). This finding corroborates with the work of Gonen et al. (2016) who argue that technological competencies can aid in maximising the time spent in updating and developing technology-based content and pedagogical tools for teaching.

Another important finding from this study concerns the times of the school day when teachers use VT in their classroom. It appears that these teachers tend to use video resources most often in the mornings, with a frequency of 48% compared to afternoon (14%) and midday (39%). This outcome is not surprising, especially, since recent studies have shown that people learn better at different times of the day, particularly in the morning (e.g., Pope, 2016). However, while this is the case, such outcomes are also influenced by factors such as the subject being learned and the teacher's role. For example, Pope (2016) found that having a morning Math or English class instead of an afternoon class on either subject increased a student's grade point average (GPA). Hence, in order to increase the efficiency of the school system towards learning, educators should consider the time of the day that most affects teachers' and students' productivity.

These teachers dedicated less than 25% of class time to technology-based video content and pedagogy. This might be indicative of the level of technological literacy among teachers, some of whom are not adequately trained to use video-based tools in their classroom. However, it also seems that using educational videos for a short period engages students better than bingeing on them for too long, and thereby negatively affecting their concentration levels. Teachers should create or use short videos with engaging and active learning features in order that these have a productive influence on students' learning experience (Brame, 2016).

Most of these teachers (75%) used less than 20 videos in a given semester, suggesting that it may not necessarily override the need for traditional teaching methods (Dimitrios et al., 2013; Hendriks, 2016). This is consistent with some studies that have argued that learning how to teach with digital technologies was much more complex than teaching with traditional technologies, and subsequently required new ways to describe, develop and measure the "complex, multifaceted and situated nature of knowledge" (Mishra & Koehler, 2006, p. 1017). Although these

teachers frequently used video for classroom teaching, the comparatively low number of titles suggests that "good videos were hard to find" (Allison, 2015, p. 126).

7.3 TAM theoretical framework

The results of this study is considered through the context of the TAM theoretical framework. The most popular VT devices used in secondary schools in Jordan were revealed to be laptops, personal computers and smartphones whereas the most popular frequency of video use in classroom was found to be quite infrequent (weekly or occasionally). The identified popular devices and frequency of use are based on the statistics of a reasonable sample. The results may therefore be considered as being representative of the total population. The popularity of the already popular devices can potentially be amplified by using them in the right frequency. In accordance with the TAM framework in the context of this study, if the right devices were used to the right extent, then the perceived ease of use and perceived usefulness would be positively present in both teacher and students. Perhaps it may be appropriate to consider the statistically-derived popular devices (laptops, personal computers and smartphones) being used at an appropriate amount (perhaps weekly as statistically suggested), then this would lead to the perceived ease of use and perceived usefulness would be positively present in both teacher and students. The flow-on effect would then be a shift in attitude towards use (AU) and behavioural intention (BI), which will eventually lead to actual use (acceptance of technology). Since the laptops, personal computers and smartphones are already popular devices, using them in the right frequency will only add to their acceptance or popularity.

To further add to the level of acceptance and use of VT, perhaps the weekly usage (most popular frequency of use as identified above) may be paired with the most effective time of day for learning (mornings). Screening videos or using VT at this time of the day, as discussed previously, may have the added benefit of better knowledge transfer to students (they are more focused in the morning). When students feel that they have learnt more content, their perceived ease of use and usefulness will change their attitude friendly towards the VT in question, which will in turn leads to the intention of use and acceptance of the VT as an integral part of their learning.

8 Limitations and recommendations

Robustness and validity of this study may be compromised by various factors and limitations. Specifically, the cross-sectional nature of this study may amplify the limitations of self-reporting. Repeated surveys in a longitudinal study design could potentially enhance the results or bring the current results to question. Another potential limitation is that this study was conducted in the capital city of Jordan and so the results may not represent the views of secondary school teachers across the entire country. Although the sample size for the interviews was reasonable (N=24), it may still not be representative of all teachers in Jordan. The teachers in this sample have greater access to VT than other regions because Amman is the capital and technological hub of Jordan. Therefore, further studies could explore the extent to which VT is used for teaching in the entire country with data that is representative of the entire nation.

The requirement that Grades 12 teachers finish their curriculum before the students' *Tawjihi* national examinations limited their participation in the study and thus lessened the impact of their perspective on the data. Perhaps a further study that focuses on this particular category of teachers would be helpful in creating a better understanding on how VT can help ease some pressure off Grade 12 teachers.

The IMM approach used in conducting this study was necessary for time management, but it limited the analysis of the qualitative data that emerged from the interview phase. Generation of relevant themes from the wealth of data contained in the transcripts was constrained by the desire to make connections with the quantitative survey data. Further studies, or subsequent analysis of the present data, could adopt a sequential explanatory mixed methods approach, where data from each component are discussed in length to complement each other.

9 Implications of the study

Pedagogical implications for how VT can support teaching practice in schools can be inferred from the results of this study. Most of the teachers who were interviewed reported teaching with VT was 'convenient' and helped them to 'save time'. Quantitative analysis supported a similar theme, with results of the frequency of video usage and devices used for VT in teaching suggesting that most of the teachers often used their own devices to enhance their pedagogical practice. Given the effectiveness of VT for teaching, it might be helpful to consider how such technology can help in improving pedagogical practice. The gap in technological literacy can be bridged through adequate training for teachers, including creating a unit on Education and Technology that could assist students who are not be technologically savvy on how to integrate technology into their teaching practice. Such training programs can help teachers create their content pedagogical knowledge through using the right technologies to develop their instructional videos. Having such training could enhance students' performance, and increase

engegement with innovative technologies, as the teachers adopt appropriate video-pedagogical activities that clarify complex concepts and ideas in the curriculum.

10 Conclusions

This study aimed to answer the following research questions:

1. What kinds of devices are frequently used to view instructional videos in secondary school teachers in Amman city, Jordan?; and
2. How frequently do secondary school teachers in Amman city (Jordan) use video as a tool for teaching?

It was found that most of these teachers, particularly female, those who teach both Grade 11 and 12 and those in public schools, used three of their personal mobile devices: smartphones, laptops, and desktop computers. In relation to the frequency of use, and it was found that the teachers mostly used VT in the morning classes for teaching and rarely used videos on a daily basis.

Cross-tabulation of the results (Chi-squared test) showed that there is a statistically significant relationship between the number of videos used in an academic year and the frequency of the video usage.

This paper may potentially have profound impact on teaching practice as it is a baseline study that could help researchers build on the current results. The present study could improve the effective use of VT in the Jordanian education sector by enhancing the understanding of how and the extent of VT utilization in current teaching practices.

References

Abdallah, S. (2010). *ICT acceptance, investment and organization: Cultural practices and values in the arab world: Cultural practices and values in the arab world* (illustrated ed.): IGI Global.

Abed Al-Latif, M. (2015). *The impact of using iPad in teaching the 3D shapes units on promoting spatial visualization and achievement in mathematics for eight grade students Jordan*: Yarmouk University (Unpublished Master thesis). Jordan: Yarmouk University.

Abuhmaid, A. (2011). Embracing ICT by the Jordanian education system. In *ICT acceptance, investment and organization: Cultural practices and values in the Arab world* (pp. 34-51): IGI Global.

Abuhmaid, A. (2014). Teachers' perspective on interactive whiteboards as instructional tools in Four Jordanian schools. *Contemporary Educational Technolog, 5*(1), 73-89.

Adely, F. (2004). The mixed effects of schooling for high school girls in Jordan: the case of Tel Yahya. *Comparative Education Review, 48*(4), 353-373.

Ajloni, M. (2019). *The use of video technology in the classroom among Jordanian secondary teachers in Amman: An integrative mixed methods study.* (Master of Philosophy). University of Newcastle (UoN), University of Newcastle (UoN)-Australia. Retrieved from file:///C:/Users/Musa3ajlouni/Downloads/Thesis%20(16).pdf

Ajloni, M., & O'Toole, M. (2021). Conceptualizing pedagogical processes in video-based learning. *LUMAT-B: International Journal on Math, Science and Technology Education, 6*(1), 1-17. Retrieved from https://journals.helsinki.fi/lumatb/article/view/1496

Ajlouni, K., & Aljarrah, A. (2011). The impact of using the Kidsmart program on facilitating childer's access and use of ICT tools according to Jordanian public kindergarten teachers' viewpoint. *Education, 132*(2), 241-261. Retrieved from https://web.b.ebscohost.com/abstract?direct=true&profile=ehost&scope=site&authtype=crawler&jrnl=00131172&AN=70532594&h=8Bhljl%2fi2pv%2bYbRKXgwKNaTdYSSoRq31%2fOY9oeDHRpAt1h%2fRwetnn6XVU2stpQORz2QsyXov0i7e%2fNwYSMhs8A%3d%3d&crl=c&resultNs=AdminWebAuth&resultLocal=ErrCrlNotAuth&crlhashurl=login.aspx%3fdirect%3dtrue%26profile%3dehost%26scope%3dsite%26authtype%3dcrawler%26jrnl%3d00131172%26AN%3d70532594

Akour, M. A., & Shannak, R. O. (2012). Jordan education reform for the knowledge economy support project − a case study. *Journal of Management Research, 4*(4)

Al Saif, A. A. (2005). *The motivating and inhibiting factors affecting the use of web-based instruction at the University of Qassim in Saudi Arabia*: Wayne State University.

Al-Harbi, S. S., & Alshumaimeri, Y. A. (2016). The flipped classroom impact in grammar class on EFL Saudi secondary school students' performances and attitudes. *English Language Teaching, 9*(10), 60. doi:10.5539/elt. v9n10p60

Alkawaldeh, N. (2014). Barriers to utilizing ICT for educational purposes in Jordan. 1-23.

Alkhawaldeh, N., & Menchaca, M. (2014). Barriers to utilizing ICT in education in Jordan *International Jl. on E-Learning, 13*(2), 127-155. Retrieved from https://www.learntechlib.org/p/39525/

Allison, C. (2015). *The use of instructional videos in K-12 classrooms: A mixed-method study.* (Doctor of Education). Faculty of the College of Education, Indiana University of Pennsylvania, United States.
Aloraini, S. (2012). The impact of using multimedia on students' academic achievement in the College of Education at King Saud University. *Journal of King Saud University - Languages and Translation, 24*(2), 75-82
Al-Shboul, M. (2012). Teachers' perceptions of the use of EduWave e-learning system in public schools in Jordan. *The Journal of Human Resource and Adult Learning, 8*(2), 167-181.
Alzyoud, M. S., Khaddam, A., & Al-Ali, A. S. (2016). The impact of teaching tolerance on students in jordanian schools. *Journal of Humanities and Social Sciences, 15*(1).
Alzyoudi, M., Sartawi, A., & Almuhiri, O. (2015). The impact of video modelling on improving social skills in children with autism. *British Journal of Special Education, 42*(1), 53-68
Assaf, A. A. (2014). The Effect of Macroeconomic Variables on Jordan's Economic Growth. *European Journal of Social Sciences, 42*(1), 101-111.
Bakri, A. A. (2013). An overview of information and communication technology (ICT) in Jordan: review the literature of usage, benefits and barriers. *International Journal of Internet and Distributed Systems, 01*(02), 9-15.
Basheti, I. A., Hait, S. S., Qunaibi, E. A., Aburuz, S., & Bulatova, N. (2016). Associations between patient factors and medication adherence: A Jordanian experience. *Pharm Pract (Granada), 14*(1), 639.
Bautista, A., Tan, C., Wong, J., & Conway, C. (2019). The role of classroom video in music teacher research: a review of the literature. *Music Education Research, 21*(4), 331-343
Benitez-Galbraith, J., & Galbraith, C. S. (2019). Narrative Engagement, Enjoyment, Learning and Theme Comprehension: Using an Authentic Music Video in an Introductory College Language Classroom. *RELC Journal*, 0033688219874136.
Beyer, S., Rynes, K., Perrault, J., Hay, K., & Haller, S. (2003). Gender differences in computer science students. *ACM SIGCSE Bulletin, 35*(1), 49-53.
Brabazon, T. (2002). *Digital Hemlock: Internet Education and the Poisoning of Teaching*: UNSW Press.
Brame, C. J. (2016). Effective educational videos: Principles and guidelines for maximizing student learning from video content. *CBE—Life Sciences Education, 15*(4), es6.
Brantley-Dias, L., & Ertmer, P. (2013). Goldilocks and TPACK: Is the construct 'just right?'. *Journal of Research on Technology in education, 46*(2), 103-128.
Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. Qualitative research in psychology. *Qualitative Research in Psychology, 3*(2), 77-101.
Brown, I. (2016). Blended Learning with Student BYOD Smartphones and iPhones. *言語文化研究, 36*(1), 79-119.
Brown, I. (2018). Gender Differences in the Use of Smartphones and iPhones for Language Learning. *言語文化研究, 38*(1), 179-209.
Bruce, D. L. (2009). Writing with visual Images: examining the video composition processes of high school students. *Research in the Teaching of English, 43*(4), 426-450.
Burston, J. (2013). Mobile-assisted language learning: A selected annotated bibliography of implementation studies 1994–2012. *Language Learning & Technology, 17*(3), 157-225.
Castro, F. G., Kellison, J. G., Boyd, S. J., & Kopak, A. (2010). A methodology for conducting integrative mixed methods research and data analyses. *J Mix Methods Res, 4*(4), 342-360
Chuang, K.-W. (2009). Mobile Technologies Enhance the E-Learning Opportunity. *American Journal of Business Education, 2*(9), 49-54.
Cox, S. (2008). *A conceptual analysis of technological pedagogical content knowledge.* (Doctor of Philosophy). Brigham Young University - Provo,
Creswell, J. (2007). Designing and Conducting Mixed-Methods Research. In: Sage, Thousand Oaks, CA.
Creswell, J., & Clark, P. (2017). *Designing and conducting mixed methods research* (J.-T. Lee Ed. 3rd ed ed.). Texas A&M University, College Station, TX, USA: Los Angeles: SAGE Publications.
Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly,13*(1), 319-340.
Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User acceptance of computer technology: a comparison of two theoretical models. *Management science, 35*(8), 982-1003.
Dimitrios, B., Labros, S., Nikolaos, K., Koutiva, M., & Athanasios, K. (2013). Traditional teaching methods vs. teaching through the application of information and communication technologies in the accounting field: Quo Vadis? *European Scientific Journal, 9*(28).
Ferry, B. (2009). Using mobile phones to enhance teacher learning in environmental education.
Fishbein, M., & Ajzen, I. (1975). Belief intention and behavior: An introduction to theory and research. *Attitude, Intention and Behavior: An Introduction to Theory and Research, 578*.

Gajria, K. (2007). Technology and the classroom: Computer education in Jordanian public schools. *ISP Collection*, 12.
Ghazal, M. (2016). Population stands at around 9.5 million, including 2.9 million guests. Retrieved from http://www.jordantimes.com/news/local/population-stands-around-95-million-including-29-million-guests
Ghazzawi, M. (2002). Design software learning computerized study of their impact and the impact of variable movement in the collection of sixth grade students the basic concepts of pilgrimage for some. *Journal of Educational and Psychological Sciences, 3*(2), 1-15.
Gonen, A., Sharon, D., & Lev-Ari, L. (2016). Integrating Information Technology's competencies into academic nursing education–An action study. *Cogent Education, 3*(1), 1193109.
Graham, C., Culatta, R., Pratt, M., & West, R. (2004). Redesigning the teacher education technology course to emphasize integration. *Computers in the Schools, 21*(1-2), 127-148.
Gromik, N. (2009). Producing cell phone video diaries. In *Handbook of Research on Web 2.0 and Second Language Learning* (pp. 259-273): IGI Global.
Hamadneh, I. M., & Masaeed, A. A. (2015). Math teachers attitudes towards photo math application in solving mathematical problem using mobile camera. *Educational Research and Reviews, 10*(14), 1930-1936.
Hamam, S., Abu Abbas, O., Abdel-Qader, R., & Abu-Shanab, E. (2008). *E-learning as Learning Method in Jordanian Primary and Secondary Education Environment*. Yarmouk University, Irbid-Jordan.
Hendriks, D. (2016). *Comparing traditional and digital learning methods to improve the learning outcomes of young children.* (Master's Thesis). Master's Thesis, Faculty of Humanities, Tilburg University,
Hockly, N. (2013). Designer learning: The teacher as designer of mobile-based classroom learning experiences. Monterey, CA: The International Research Foundation for English Language Education. In.
Hodges, R. (2015). *Transformation of sympathies: Gendered mediation of Jordanian education reform for a knowledge economy*, Arts & Sciences Electronic Theses and Dissertations.
Huizenga, J., Admiraal, W., Akkerman, S., & Dam, G. t. (2009). Mobile game-based learning in secondary education: Engagement, motivation and learning in a mobile city game. *Journal of Computer Assisted Learning, 25*(4), 332-344.
Hyde, K. (2000). Recognising deductive processes in qualitative research. *Qualitative Market Research: An International Journal, 3*(2), 82-90.
Imaddin, M. (2004). The development of education national report of Jordan. *Quality Education for All Young People: Challenges, Trends and Priorities*, 1-52.
Jenson, J., & Droumeva, M. (2017). Revisiting the media generation: Youth media use and computational literacy instruction. *E-learning and digital media, 14*(4), 212-225.
Jordan Population. (2018a). Jordan Population. Retrieved from http://countrymeters.info/en/Jordan
Jordan Population. (2018b). Jordan Population Retrieved from http://www.worldometers.info/world-population/jordan-population/
Joseph, J. (2012). The barriers of using education technology for optimizing the educational experience of learners. Procedia - Social and Behavioral Sciences, 64, 427–436. https://doi.org/10.1016/j.sbspro.2012.11.051
Keddie, J. (2014). *Bringing online video into the classroom-Into the Classroom*: Oxford University Press.
Khasawneh, M. (2015). Factors Influence e-learning utilization in Jordanian universities - academic staff perspectives. *Procedia - Social and Behavioral Sciences, 210*, 170-180
Kim, D., Rueckert, D., Kim, D.-J., & Seo, D. (2013). Students' perceptions and experiences of mobile learning. *Language Learning & Technology, 17*(3), 52-73.
Kleij, F. V. d., Adie, L., & Cumming, J. (2017). Using video technology to enable student voice in assessment feedback. *British Journal of Educational Technology, 48*(5), 1092-1105.
Lahn, G., Grafham, O., & Sparr, A. E. (2016). *Refugees and Energy Resilience in Jordan*. Jordan: Refugees and Energy Resilience in Jordan.
Levy, P. (2000). *Getting started with the Internet: An easy and practical guide for teachers*: Scholastic Inc.
Loera-Varela, A., & Mejía, F. (2018). *Using videos to improve teaching practice*.
Loera-Varela, A., Flores, A. M., & del Campo, A. F. M. (2018). Using video-lessons to improve the quality of teaching.
Lu, M. (2008). Effectiveness of vocabulary learning via mobile phone. *Journal of Computer Assisted Learning, 24*(6), 515-525.
Major, L., & Watson, S. (2017). Using video to support in-service teacher professional development: the state of the field, limitations and possibilities. *Technology, Pedagogy and Education, 27*(1), 49-68
Manero, B., Torrente, J., Serrano, Á., Martínez-Ortiz, I., & Fernández-Manjón, B. (2015). Can educational video games increase high school students' interest in theatre? *Computers & Education, 87*, 182-191

Marklund, B. B. (2015). *Unpacking digital game-based learning: The complexities of developing and using educational games.* (Doctoral dissertation unpacking digital game-based learning, the complexities of developing and using educational games). University of Skövde, Sweden, Sweden.
Maxwell, B. (1996). Translation and cultural adaptation of the survey instruments. *Third international mathematics and science study (TIMSS) technical report, 1*, 159-169.
McKinney, A., & Page, K. (2009). Podcasts and videostreaming: Useful tools to facilitate learning of pathophysiology in undergraduate nurse education? *Nurse Educ Pract, 9*(6), 372-376.
Ministry of Education. (2018). Ministry of Education. 1-61.
Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers College Record, 108*(6), 1017–1054
Moura, A., & Carvalho, A. A. (2008). *Mobile learning: teaching and learning with mobile phones and Podcasts.* Paper presented at the 2008 Eighth IEEE International Conference on Advanced Learning Technologies.
Mullis, I. V., Kelly, D. L., & Haley, K. (1996). Translation verification procedures. *Third International Mathematics and Science Study: Quality assurance in data collection. Chestnut Hill, MA: Boston College. Consultado el, 10*.
Mustafa, M., & Cullingford, C. (2008). Teacher autonomy and centralised control: The case of textbooks. International Journal of Educational Development, 28(1), 81–88.
Nasr, H. A. (2005). Study of effectiveness of the use of multimedia technology in the teaching of computer engineering at the third preparatory grade pupil achievement and the development of creative thinking they have. *Cairo University, 13*(2), 1-12.
O'Rourke, J., Main, S., & Ellis, M. (2013). 'It doesn't seem like work, it seems like good fun': Perceptions of primary students on the use of Handheld Game Consoles in mathematics classes. *Technology, pedagogy and education, 22*(1), 103-120.
Obeidat, O., & Dawani, Z. (2014). Disseminating and using student assessment information in Jordan. *The International Bank for Reconstruction and Development / The World Bank*, 1-60.
Olafson, Feucht, & Marchand. (2013). A typology of visual displays in qualitative analyses. *Learning Through Visual Displays*, 359-380.
Oliemat, E., Ihmeideh, F., & Alkhawaldeh, M. (2018). The use of touch-screen tablets in early childhood: Children's knowledge, skills, and attitudes towards tablet technology. *Children and Youth Services Review, 88*, 591-597
Paolo, T. D., Wakefield, J. S., Mills, L. A., & Baker, L. (2017). Lights, camera, action: Facilitating the design and production of effective instructional videos. *TechTrends, 61*, 452–460
Phan, M. H., Jardina, J. R., Hoyle, S., & Chaparro, B. S. (2016). Examining the role of gender in video game usage, preference, and behavior. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting, 56*(1), 1496-1500
Pope, N. G. (2016). How the time of day affects productivity: Evidence from school schedules. *Review of Economics and Statistics, 98*(1), 1-11.
Popper, K. (2014). *Conjectures and refutations: The growth of scientific knowledge*: routledge.
Qudah, K. Y., Hussain, J. A., & Al Matari, R. (2013). Students' attitudes in colleges of education at the Jordanian universities towards mobile phone usage in university education. *International Journal of Interactive Mobile Technologies (iJIM), 7*(2)
Qunaibi, F. (2016). The attitudes of teachers and students towards using tablet in learning and teaching in Jordanian school. *Arab Journal of Sciences and Research Publishing, 5*(2), 84–101.
Rapeepisarn, K., Ponghankae, S., Wong, K. W., & Fung, C. C. (2008). *Esucational Use of Handeheld Game Consoles - SPS and NDS in Thai Colleges* Paper presented at the The 7th International Conference on e-Business 2008 (INCEB 2008).
Saldana, J. (2015). *The Coding Manual for Qualitative Researchers* (3 ed.). Los Angeles, CA: Sage: SAGE, 2015.
Schofield, J. W., & Davidson, A. L. (2017). The impact of internet use on relationships between teachers and students. In *Culture, Technology, and Development* (pp. 62-79): Psychology Press.
Selvarajan, R. (2018). Role of Videos to Enhance Learning Skill in English Language Teaching. *Language in India www.languageinindia.com, 18*(1), 559-576.
Shohel, M. M. C., Jia, M., Jahan, R., & Roy, G. (2015). Methodological Challenges and Concerns of Using Interview Method to Conduct Socio-culturally Sensitive Research. *Bangladesh Journal of Educational Research, 1*(2), 100-115.
Sung, Y.-T., Chang, K.-E., & Liu, T.-C. (2016). The effects of integrating mobile devices with teaching and learning on students' learning performance: A meta-analysis and research synthesis. *Computers & Education, 94*, 252-275.

Sylvester, P. (2019). Crime and Terrorism in Jordan: Should You Be Concerned? Retrieved from https://www.worldnomads.com/travel-safety/middle-east/jordan/crime-and-terrorism-jordan

Taani, D. Q. (1997). Caries prevalence and periodontal treatment needs in public and private school pupils in Jordan. *International dental journal, 47*(2), 100-104.

Unal, S., & Ozturk, I. H. (2012). Barriers to ITC integration into teachers' classroom practices: Lessons from a case study on social studies teachers in Turkey. *World Applied Sciences Journal, 18*(7), 939-944.

Warlick, D. (2009). Grow your personal learning network: New technologies can keep you connected and help you manage information overload. *Learning & Leading with Technology, 36*(6), 12-16.

Williamson, S. (2019). *Separating Islam from politics but not the state: Implications for religious autority in Jordan*. Retrieved from https://www.bakerinstitute.org/media/files/files/a65139aa/cme-pub-luce-williamson-030719.pdf

Woolfitt, Z. (2015). The effective use of video in higher education. *Lectoraat Teaching, Learning and Technology Inholland University of Applied Sciences, 1*(1), 1-49. Retrieved from https://www.inholland.nl/media/10230/the-effective-use-of-video-in-higher-education-woolfitt-october-2015.pdf

World population review. (2018). Jordan Population 2018. Retrieved from http://worldpopulationreview.com/countries/jordan-population/

Zaranis, N., Kalogiannakis, M., & Papadakis, S. (2013). Using mobile devices for teaching realistic mathematics in kindergarten education. *Creative Education, 4*(7), 1-10.

Zoubi, Q. A. (2018). *The department of statistics of Jordan (DoS)*. Jubeiha, Amman, Jordan: The Department of Statistics of Jordan (DoS)