

## Viewing comprehension: Students' learning preferences and strategies when studying from video

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**Abstract.** This research examined how students at the Open University of Israel studied from video recordings of lectures. At the semester's end, seven history students were interviewed in order to trace their experiences, learning strategies and preferences. It was found that (1) reading comprehension strategies are inappropriate for viewing comprehension, (2) presumed theoretical advantages associated with instructional video may in fact be disadvantages, (3) the medium does indeed influence the message, (4) mismatching medium and message may have deleterious results on students' cognitive and affective outcomes and (5) surface-level orientations to study may be hindered by video.

**Keywords:** approaches to learning, distance education, learning preferences, study strategy, video

Instructional television, which appeared in the early 1950's, has since attracted many researchers who examined its effectiveness (e.g., Dubin & Hedley, 1969), the prerequisite skills it demanded (e.g., Salomon, 1979), its effect on students' attitudes and academic experiences (e.g., Cohen, Ebeling & Kulik, 1981), and the relation between certain technical aspects such as screen size and achievement (e.g., Gopalakrishan-Jayasinghe, Morrison & Ross, 1997).

### Implementing video in a curriculum

There are several forms of instructional television. Historically, instructional television began with live broadcasts, produced in studios and transmitted via public channels. When the use of videotapes became common in educational institutes, the tape, either recorded from a public television channel or bought as an instructional kit, made both production and viewing more flexible. Generally, viewing became more flexible since the inconvenience of fixed transmission time was removed;

specifically, flexible control of presentation (by stopping, rewinding or forwarding the tape) afforded new dimensions to instruction. Satellites and cable TV embedded with two-way communication media increased the potential for interactivity. These technologies were of particular importance to distance education systems. Finally, the emergence of relatively inexpensive personal computers and CD-ROMs created new opportunities for educators to produce instructional materials. Subject matter could be delivered in interactive modes, learner preferences could be met and learner control enhanced. A review of the pedagogical and psychological advantages of video follows.

### **Pedagogical advantages**

For some categories of learning, viewing motion may facilitate understanding, since many tasks are difficult to explain verbally (Wetzel, Radtke & Stern, 1994; Wisher & Curnow, 1999). A coarse division reveals three kinds of instructional video: demonstration, narrative, and recorded lectures.

*Demonstrational video* has two aims: viewing procedures that otherwise are not available to students or recording students' performance for feedback purposes. For example, in a medical context, the first goal is particularly relevant, since many clinical situations are unavailable to students. Indeed, the use of demonstrative video in this domain is wide (Parkin & Dogra, 2000). Comparing the effectiveness of text-based material and demonstrational video was done by Felton, Keesee, Mattox, McCloskey and Medley (2001). One group of students viewed a video of a manufacturing process, a second group read a text that explained the process while a third group watched an unrelated video which served as a control. Posttest scores revealed a statistically significant improvement for the first group only. In another study, Michas and Berry (2000) tested the bandaging performance of five groups of students who learned from text, drawings, text plus drawings, video film, or still pictures. Of these five groups, the video and the text plus drawings groups performed significantly better than the others. The authors concluded that the dynamic presentation of information afforded by video allowed learners to develop a better mental model of the bandaging task.

*Narrative video* is commonly used in learning a language. In this domain, narrative video is useful and effective because it presents the learner with a full communicative and cultural context of language alongside its lexical and grammatical aspects. However, research

findings concerning the effectiveness of narrative instructional video are ambiguous (Fisch, 2000, 2002).

*Video recorded lectures* are a remnant of instructional television in which instructors deliver subject matter as they do in class. As opposed to narrative video, here “subject matter” receives full attention; visual elements and cues may not be the most important components in this video form. Furthermore, it is not clear whether video recording has any advantage over audio recording. If the video was filmed in a “real” classroom, then some of the questions that student viewers might have asked are indeed asked by the filmed students. Ellis and Childs (1999) reported that video producers and learners disagreed on the perceived value of videotaped lecture. Producers believed that it outlined the subject while learners were not receptive to the language and style of presentation and they lost interest when watching.

Despite criticism, there are still several perceived advantages to this kind of video presentation. First, talented lecturers in a specific domain can be taped and then viewed later. Second, by viewing themselves, instructors may work on self improvement. Third, if students miss class they can view the video at their convenience. However, Bell, Cockburn, McKenzie, and Vargo (2001) found that despite a declared intention to use video recorded lectures, many students did not use them. Nevertheless students urged instructors to maintain this option and the authors concluded that many students deluded themselves about their intentions regarding this alternative. They suggested that because recorded lectures were freely available to students, students were able to postpone viewing the lectures because “they’ll still be available tomorrow”. Nonetheless, poor video quality and limited accessibility were the main explanations raised by students.

Crain (1994) compared the effectiveness of video recordings and face-to-face lectures. It was found that in a test given immediately after the instructional presentation, students in the face-to-face lecture scored higher than their counterparts who viewed the recorded lecture. However, four weeks later, the two groups obtained similar scores.

## **Psychological advantages**

### *Cognitive aspects*

Several cognitive aspects of viewing comprehension are especially noteworthy. First, Salomon (1979) argued that the most important attribute of a medium is the way it inherently and implicitly structures and presents information, especially when learning and cognition are

considered. Since different media structure information differently, diverse mental skills are required. Moreover, students' preconceptions of the *perceived* effort required by the medium influence the amount of *actual* effort invested in processing a lesson presented through that medium. The amount of mental effort learners invest in any mediated lesson influences the quantity and quality of information they gain from that lesson (Cennamo, 1993). Given that within a medium there can be different ways of structuring information, video is not uniform regarding the mental effort needed.

Second, research which focused on comprehension of video content showed that narrative video, involving the simultaneous processing of narrative content and educational content sometimes overburdened learners' internal data processing mechanisms (e.g., Beentjes & van der Voort, 1993). On the one hand, since viewing comprehension depends upon the degree of integration between narrative and educational contents if there is weak integration between the two, then mental resources are devoted primarily to the narrative. On the other hand if integration is high, then the two components are complementary, rather than competitive (Fisch, 2000).

Third, short-term learning benefits from narrative educational television have been shown to be limited whereas long-term effects have been shown to be beneficial (Huston, Anderson, Wright, Linebarger & Schmitt 2001).

Fourth, it is unclear whether transfer occurs in narrative video (Fisch, 2002). Learning skills gained while learning with video are sometimes impossible to transfer to a text-based medium (Koran, Snow & McDonald, 1971).

Finally, theories within cognitive psychology emphasize learning from more than one modality source (e.g., Paivio, 1986; Mayer, 2001). These theories contend that humans actively process information and that there are separate systems for processing visual and verbal representations. This is done by first attending to the relevant information, next by mentally organizing it into coherent representations, and finally by integrating these representations (Mayer, 2001). Thus, one might expect that a video presentation, which activates both visual and verbal channels, may lead to better learning outcomes if integration between narrative and educational contents is complementary. In the same vein, Zollman and Fuller (1994) argued that video presentation provides several paths of retrieval cues. While this might be true of demonstrative and narrative video, it is questionable whether this is true for video recordings of lectures. It is not clear if students benefit from this type of video since the visual modality contributes almost nothing.

### *Affective aspects*

Two key factors – narration and pace – influence affective aspects of learning from video. White, Easton and Anderson (2000) argued that learning a language through narrative video creates a low-anxiety learning environment. In addition, narrative video also accounted for increased student motivation. Regarding pace, Shea (2000) reported that video was especially effective for low-achievement students since it enabled them to match learning pace with their own needs. This, in turn, led to improved grades and motivation.

On the one hand, since pace appears to be a general variable relevant to all kinds of video, it may be inferred that this characteristic will generate positive affective outcomes for all kinds of video use; in this case, even for recorded lectures. On the other hand, if narrative is a more dominant factor, then these expectations may not materialize.

### **Studying strategies**

#### *Reading*

This research focuses on how students approach the task of studying from video recorded lectures. In order to gain a broad perspective, students' methods of studying and learning from books were reviewed. Säljö (1997) noted that learning through reading in the academic context differs from the kind of reading that typifies other contexts. A fundamental difference between these contexts is the degrees of freedom that readers have: that is, what to read, by when, and, in extreme cases, even how to interpret the text. Säljö claimed that in an academic context a special demand is placed upon readers: through reading they are expected to increase their knowledge. He contended that this demand increases the difficulty involved in the process of reading. There is wide agreement that learning from a text requires the learner to form deep-level mental representations of the text material (e.g., van Dijk & Kintsch, 1983, Voss, 1984).

Qualitative analyses divided studying into two categories: surface level (an orientation toward reproducing subject matter by memorization) and deep level (generation or transformation of knowledge). Deep level orientation toward reading focuses on comprehension (Marton & Säljö, 1976; Säljö, 1997). Generally, deep level approaches result in better learning outcomes; these can be achieved by strategies such as summarizing (e.g., Kiewra, DuBois, Christian, Mcshane, Meyerhoffer &

Roskelly1991), generating explanations (e.g., Magliano, Trabasso & Graesser, 1999), or building concept maps (e.g., Novak, 1990). In memory research literature, the effect of better memorization for self-generated items as opposed to already-generated text items, was termed the generation effect (Slamecka & Graf, 1978) and received widespread experimental and theoretical attention. One explanation for the generation effect is that generating is more likely than reading to promote procedures during encoding that can be restored during a typical retention test (McNamara & Healy, 1995). In a pedagogical context, it was found that note taking and summarizing resulted in higher achievements than copying or reading already-generated material (Kiewra et al., 1991; Lahtinen, Lonka & Lindblom-Ylänne, 1997), thus highlighting the advantage of constructive procedures as opposed to reproductive ones.

Spontaneous strategies for studying through reading were investigated in several studies (e.g., Foos, Mora & Tkacz, 1994; Lahtinen, et al., 1997; Slotte & Lonka, 1999). It has been found repeatedly that students who use generative or constructive strategies do indeed perform better than students who draw on reproductive strategies or read the text without any other productive activities. In addition, students' spontaneous study tactics are at least as effective as tactics imposed by training (Thornton, Bohlmeier, Dickson & Kulhavy, 1990).

#### *Video/Instructional television*

To the authors' knowledge, strategies students adopt when studying from video have not yet been recorded. Since a medium inherently and implicitly structures and presents information, learning strategies may be dependent upon the medium through which learning material is presented. For example, summarizing material from a video presentation involves different mechanisms than summarizing from a book. When reading, students prefer to write their own notes alongside the original text in a book or prefer marking written texts; these actions are currently impossible with video. In addition, some learning strategies may be hindered by video which "streams" without clear boundaries whereas written text "stays"; that is, in video presentations, subdivisions into parts, chapters, and sub-chapters may be blurred. However, innovative modes of digital video may include subdivisions. Other distinctions include how important matters are emphasized and how context is maintained. In video, emphasis is achieved by changing intonation or by adding special sound while in books it is achieved by using different type sets. In video, context is

maintained by rewinding and forwarding which is more demanding and prone to unwanted skips, as opposed to books wherein students simply turn pages.

#### *Learning preferences vis-à-vis media*

To complete this literature review, we add one final aspect: the preferences students manifested when studying with video material through different delivery systems. Sadler-Smith and Riding (1999) found that students generally preferred print-based media over nonprint media. However, individuals that retained a global or overall view of information (“Wholists”) expressed a stronger preference for nonprint media (such as overhead transparencies, slides and video tapes) than did individuals who process and organize information into its component parts (“Analytics”). Sadler-Smith and Riding explained that this might be a result of the global view exhibited by the visual image and its nonlinearity.

Direct evidence for preferences of video cassettes over live, interactive video-based tutorials came from Beyth-Marom, Saporta and Caspi (2004). They found that a majority of distance education university students preferred asynchronous videocassettes over satellite-based synchronous tutorials. They also found that most students prefer the flexibility and control granted while studying at home with videocassettes over the social immediacy structured into synchronous satellite-based tutorials.

#### **Rationale for this study**

The current study focused on how students learned from video recorded lectures. The emphasis is on how students studied and what they preferred, rather than on learning outcomes. In order to search for unique characteristics of learning from video, the students who participated in the study were asked to analyze their experience with the video recordings. This was done by comparing these experiences with the more frequent, familiar and ingrained modes of learning associated with self-instruction texts and face-to-face tutorial meetings.

A naturalistic approach was adopted since few research findings appeared in the literature. The open ended approach helped us to better understand the questions and issues involved and to formulate initial, tentative hypotheses concerning the strategies adopted by students when learning from video.

**Research questions**

1. What study strategies are employed by students while learning from video?
2. How does learning from video influence affective aspects of learning?
3. How does learning from video influence cognitive aspects of learning?
4. What is the relation between students' learning preferences and the perceived quality of learning from video recorded lectures?

**Background**

The course "Jews among Moslems: An Introduction to Jewish History in Moslem States in the Modern Time (1750–1914)" has eight written units and four videotape units. The videotape units are lectures, presented by the instructor in a studio, that cover topics not presented in the written texts. The course included four assignments, one of which was based on the video units. Four face-to-face tutorial sessions were held during the semester; participation was optional.

**Method***Participants*

Seven students, aged 25–57, participated in the study. Six had already completed eight or more courses; one had completed only one previous course. Three students viewed the recordings using an analog video cam recorder while the other four viewed them on their personal home computers using a CD-ROM. Since this is a preliminary, exploratory study, differences between these two video delivery systems were not compared in the current study.

*Procedure*

Each of the participants was interviewed once, at the end of the course, in a semi-structured interview which took about 60 minutes. In order to create a comfortable and non-threatening environment, students were interviewed at their location of choice (home or work, the author's office, or a public cafe). Students were asked four broad, open-ended

questions about: (1) their background (e.g., age, reasons for studying at the Open University), (2) their study routines (e.g., preferred study locations, collaboration with others, attending course meetings), (3) the specific course (e.g., difficulty, interest), and (4) studying from video. Regarding this central issue, students were asked one general question that subsumed all of the four research questions. This was: "From your personal experience, what are the advantages and disadvantages of learning from video, especially in comparison to learning from books". The interviewer made brief notes during the session and extensive notes immediately upon completion of the interview.

A constant comparative method (Silverman, 2001) was used in which provisional hypotheses, based on the first interviews, were then tested in the following interviews until no more knowledge was gathered. Initial phases of data analysis involved classifying data in accordance with the research questions. Data generated by each student were analyzed in terms of the research questions for purposes of pattern matching. Pattern matching involves examining data and looking for similarities in the reactions, thoughts, and actions of the participants. Since this is a preliminary, exploratory study, no special procedures (e.g., agreements between independent coders) were adopted to insure data reliability beyond those described above.

## **Results**

Results are reported in four sections. First, strategies used by students to study from video are presented. Second, the affective aspects of video presentation on students are described. Third, the cognitive aspects of video presentation on students, especially the perceived differences between studying from books and video, are listed. Last, a relation between students' learning habits, in general, and learning from video, in particular, is detailed.

### *Strategies used by students to study from video*

The following three categories emerged from analyzing students' descriptions of the ways they learned from video: writing, pausing/continuing and navigating.

*Writing.* All students wrote. Some took notes while others transcribed the lecture word-for-word. Some pointed out the benefits of writing

while others perceived writing as disadvantageous. One student who found writing beneficial noted that

“In principle, I think that video isn’t a bad idea. It activates several senses: visual, auditory and writing. This way, subject matter ‘sits’ better.”

Students who found writing disadvantageous said

“I saw the tape and took notes. Then, I had to read what I wrote and that wasn’t always clear. It was a waste of time, doing the same thing twice.”

“A major advantage of the Open University is that the texts are super organized and ready for learning so you don’t have to go to lectures. In my opinion, since video makes me write and organize the subject matter, the main advantage of the university is eliminated.”

“I started the video, put a pile of paper in front of me and began to write... At first, I thought that video is good, because you can sit and listen, but (as I found out) you must also write. It’s like a lecture, but you can’t ask questions.”

*Pausing and Continuing.* Students tried to view an entire lecture in a single session; however, some discovered that pausing was necessary. All participants who interrupted viewing reported that pausing caused a serious problem which involved returning to the break point. Students reported that even though they returned to the precise point at which they stopped, they lost the context and didn’t immediately understand what followed. The following example illustrates this point:

“A pause in watching video is worse than a break in reading a book, because I felt that I have no place to return to. I lost context.”

For students who viewed the entire lecture in one sitting a particular advantage was noted.

“The video helped me. I sat for an hour and a half without a break and I finished the whole learning unit. Occasionally, it (a unit) drags on for an entire semester.”

*Navigating.* Navigating the video backward and forward was difficult and disadvantageous for some students, whereas others found it easy and advantageous. Some examples:

“...it wasn’t easy. You sit in front of the computer for two hours and you can’t mark [content]. Rewinding is annoying.”

“...an advantage is that you can repeat something over and over, like I sometimes do when I read a book; however, I never did it. A few times I stopped and ran the CD-ROM backward and then played it again. It was easy.”

*Affective aspects of video presentation*

Four aspects of video presentation, which may be classified as affective were reported: convenience, interest and enjoyment, intimacy, and a sense of control.

*Convenience.* For most students, using video was inconvenient. Several reasons were noted.

“It’s inconvenient because I have to use my computer which I don’t like and it makes me sit in a corner where I don’t like to sit. It ties me down.”

“I can’t take it with me like I do with books.”

“It’s uncomfortable to sit and read [i.e., view] material this way because it’s hard to reread a paragraph or chapter. It’s awkward and unfamiliar. I’d rather be “sprawled out” on the couch with a book.”

The sense of inconvenience seems to derive from the innate characteristics of video - its lack of mobility, the posture it demands, and the fact that it requires very different and unfamiliar learning strategies.

*Interest and Enjoyment.* When asked to respond to the interest aroused when viewing the video recordings, most students reported that the lectures were lackluster. Here, it may be difficult to differentiate between medium and message. Theoretically, there are four options for the relations between the lecture and the video: (1) one possibility is that a lackluster message may become more so because of the specific difficulties associated with learning from video recorded lecture. For most students this was the current case. (2) Another option is that interesting lectures may become less so due to constraints of the medium. (3) Less plausible for the current situation is the possibility that video improves a lackluster message. (4) It may, of course, be that an interesting message

is improved by presenting it via video. Furthermore, most of the students did not enjoy studying from the video recordings. This may have been so because the lectures were tedious, because studying and learning from video are inherently difficult tasks for students raised on books and used to live lectures, or because of an interaction between these two factors.

*Intimacy.* Students developed an intimacy with books which they did not develop with the video recordings. As one student described it,

“The relationship with a book is very intense for me... It gives me confidence and a sense of possession – I marked it, scribbled on it, inserted pagemarkers, earmarks, etc. The book became mine.”

Other comments were “Video is sterile”, “I’m not ready to give up books”, and “when viewing video I wanted to read a text instead.”

*Sense of Control.* Mechanisms for controlling video were discussed above. One psychological aspect of control was illustrated by a student who said: “The major difficulty in video is that – as opposed to books that are held in your hands – there’s no sense of direct control over it because it sits on a shelf and flows on its own.”

#### *Cognitive aspects of video presentation*

*Encoding in Memory.* As noted above, some students felt that the combination of visual and verbal inputs eased and improved memory store. One student reported that “what the lecturer said ‘sat’ real well in my memory”. However, none of the students ascribed their success in the course to this aspect of learning from video.

*Attention.* For most students, video required much more attention than books. For example:

“I need to be more concentrated with video than with a book.”

“If I miss a word or two then I might miss the whole idea so I have to be very concentrated and that’s a bore.”

For others, video eases demands on concentration

“It was easy for me to concentrate, because things are simply said, whereas in books I have to read and reread. It was much easier to understand the topic.”

*Learning habits and their relations to learning from video*

It appears that both cognitive and affective aspects of studying from video are deeply influenced by prior study behaviors which may be characterized as “rigid” and “regular” as opposed to “flexible” and “irregular”. Regular study behavior includes a fixed place of study, a well managed time schedule and permanent learning strategies. Irregular study behaviors are just that: irregular. Based on students own description of their learning habits, despite the small sample, it appears that students who disliked video tended toward more rigid study practices than those who favored it.

**Discussion and conclusions**

The purpose of this study was to investigate the ways distance learners studied from video. In the current context video cassettes (or CD-ROMs) replaced a textbook, not lectures, and served as the main learning material for distance learners. Most of the interviewees had more than two years experience in the Open University and therefore had developed their own learning preferences and strategies especially regarding their own preferred pace. They “know” how to learn based on a personal learning style (or preference).

Our first finding is that most students tried to study from video as if it was a book; in other words, these students attempted to transfer learning strategies from one medium to another. Most students were used to freely roaming back and forth through a book. The parallel strategy in a video mode is “rewind” and “forward”, which appeared to be both alien and difficult to implement as desired for these students. Furthermore, students found that some familiar and productive learning strategies, such as marking books, became impossible or very difficult to implement when studying with video. Generally, it was found that students had difficulties in adapting to the structural and cognitive demands of video. Therefore, they experienced widespread dissatisfaction with video. In light of these findings, our first conclusion is that transferring studying strategies from books to video may be difficult. This appears to be so for several reasons. The demands made by video may be inherently difficult or students may have chosen to ignore the demands since this was a one-time exception.

If it is assumed that learning difficulties in new environments emerge from ingrained or habitual study practices, then a relation may exist between the successful use of a medium and a learning preference

(Sadler-Smith & Riding, 1999). Highly organized students, who studied in fixed places and at fixed times, reported experiencing more difficulties when learning from video. This appears to be so since video requires the ability to adapt to new circumstances. Less organized students found video advantageous since they were able to finish a lesson in one sitting. A second conclusion is that learning preferences or habits may be crucial factors for determining the successful utilization of video. Less organized learners may benefit more from video than their more highly organized counterparts. However, this conclusion needs to be verified using a much larger sample.

Some apparent advantages of video were disadvantages for some students. First, although video affords self-paced studying, some students found that pausing the lecture disrupted the context, even for short pauses. Regaining context in a video mode is much more difficult than in a textual one because, in the latter, many visual cues help retrieve context. With video, context retrieval, involving rewinding and replaying, sometimes caused frustration. Second, there is a presumption that video activates two separate memory channels (visual and auditory) and is therefore more effective. It was found, however, that some students suffered a cognitive overload since, in addition to hearing and watching, a third task was necessitated – note taking. Hearing, watching and writing were too demanding and resulted in negative feelings toward the medium. On the other hand, some students found this approach very beneficial.

Third, video, perceived as a “one-piece” unit best studied in a single session, proved advantageous for less organized students, who finished the course requirement in a short time. However, the video recorded lectures, which lasted for more than an hour and a half, led students to lose concentration. When producing video recorded lectures or using them, students’ attention spans must be taken into account.

To conclude, advantages for some students were disadvantages for others. Moreover, ostensible advantages may have become disadvantages because their implementation caused unexpected cognitive difficulties which led to aversive feelings.

Findings from earlier reports (Ellis & Childs, 1999) that recorded lectures may be boring were corroborated. Therefore, it was not surprising that almost all the students did not enjoy the video. This finding reemphasizes the importance of matching medium and message. In the absence of visual cues and motion, video loses advantages inherent in the medium and might more effectively be replaced by printed material or audio cassettes. This is not to say that the production of interesting

video recorded lectures is impossible; however, special attention should be dedicated to elevating student interest.

To the best of our knowledge, relationships between students' approaches to studying (deep or surface level orientations) and specific instructional media have not been investigated. Findings from this study enabled us to make a tentative hypothesis regarding the issue. It seems that students who use a surface approach to study would be frustrated since the medium makes such an approach difficult. That is, reproducing text from video requires transcribing the lectures, a step that is unnecessary with text.

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