



An Evaluation of Instructional Videos in EDUWEBTV: Technical Qualities, Pedagogical Aspects, Engagement and Perceived Impact on Learning

Melissa Ng Lee Yen Abdullah, Fong Soon Fook & Ong Saw Lan

School of Educational Studies, Universiti Sains Malaysia, Penang, MALAYSIA

Abstract

EDUWEBTV was introduced by the Malaysian Ministry of Education with the objective of providing “Digital Education for All”. It is an on-line educational portal that consists of eight channels. These channels are categorized into instructional and non-instructional channels. Instructional channels are designed as ICT resources to be integrated into the teaching and learning processes. While the non-instructional channels mainly serve the purpose to provide updated information and educational guidelines to the users. A quantitative study was carried out to evaluate the videos in instructional channels in terms of technical quality, pedagogical aspects, learners’ engagement and its impact on students’ learning. A total of 72 instructional videos were evaluated by a panel of experts from a local university. Feedbacks were also obtained from a sample of 1,120 secondary students. The validity and reliability of the instruments were ascertained prior to the study. Based on the findings, recommendations were provided to enhance the quality and impact of instructional videos in EDUWEBTV.

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Introduction

The Malaysian Ministry of Education has implemented the EDUWEBTV programme since March 2008. It is a video-based interactive educational portal that aims at developing the teaching and learning of the nation through creative information and communication technology (ICT). The mission of EDUWEBTV is in line with the Education Development Master Plan 2006-2010. It is recognized as one of the key efforts by the ministry to enhance school’s teaching and learning processes, regardless of geographical locations (Fong et al, 2010). There are eight channels in the EDUWEBTV portal, namely, news (*berita*), academic (*akademik*), documentary (*rencana*), interview (*wawancara*), curriculum (*kurikulum*), interactive (*interaktif*), live (*siaran langsung*) and guidance (*panduan*). These channels can be divided into non-instructional and instructional channels. Non-instructional channels include news, academic, documentary, interview, live and guidance channels while instructional channels were made up of curriculum and interactive channels (Hawa Said, 2009). The news channel displays daily news relevant to the educational communities while the academic channel displays knowledge sharing on best practices of teaching and learning as well as education management.

Through the documentary channel, schools with outstanding academic and co-curriculum achievements as well as best practices can be highlighted and emulated by other schools in the country. The interview channel features interviews with the ministry personalities or those linked to education field on current issues. Among those who have been interviewed were the Education Ministry’s Secretary General and Director General, heads of the ministry’s departments and agencies, as well as school principles (EDUWEBTV, 2009). The last two non-instructional channels are live and guidance channels. The former displays live-broadcast of ministry’s events via the internet and the latter provides guidelines for teachers, students, and parents in aspect of education. The curriculum and interactive channels, on the other hand, are designed specifically for instructional purposes. The curriculum channel has videos of teaching and learning materials produced by the Educational Technology Division in the Ministry of Education. These materials are developed based on the national school curriculum. The subjects covered English Language, Malay Language, Physics, Geography, Living Skills, Mathematics, Islamic Education, and so on (Table 1).

Table 1 Number of Instructional Video according to Channel, Level and Subjects

Instructional Channel	Level	Subject	No.	Subjects	No.	
Curriculum	KBSM	English language	41	Islamic Education	18	
			38		22	
	KBSM	Malay language	38	Moral	27	
			30		10	
	KBSM	Physic	7	Science	45	
	KBSM	Geography	1		24	
	KBSM	Living Skills	1	History	48	
	KBSM	Career Development	27			
	KBSM	Mathematics	5	General	52	
	KBSR		24			
	KBSM	Civics	13			
	KBSR		26			
	Subtotal					497
	Interactive	PMR	Science	21		
English Language			2			
Malay Language			5			
SPM		Mathematics	83			
		English Language	8			
		Malay Language	5			
		History	6			
Subtotal					130	
Total					627	

Note: The number of videos available as dated on 20th January 2010.

Source: Adapted from: Fong et al (2010: 48)

The interactive channel consists of learning videos specially designed for different school subjects. These videos can be used in classrooms by teachers as part of the teaching and learning process or at home by pupils as homework and revision (EDUWEBTV, 2009). At the lower secondary level, it covers subjects like Science, Malay Language, English Language, Geography and History. For the upper secondary level, the channel encompasses videos in Mathematics, Malay Language, English Language and History. Teachers who have registered themselves on EDUWEBTV are able to download the video clips from the various channels, edit them, and subsequently upload them onto their playlists, which are also hosted by the portal to be used in their lessons. Students can also download these videos for self-learning purposes.

Based on the results of an impact assessment study conducted by Fong et al (2009), more than half of the teachers have never downloaded any video clips from EDUWEBTV to be used for teaching and learning purposes. In fact, secondary teachers found that the resources do not meet their needs. This was also parallel with the findings that students spent little time on EDUWEBTV (Fong et al, 2009). The study also discovered that students' usage of instructional channels, particularly interactive channel was still considered low as compared to other channels. The study has provided preliminary information on EDUWEBTV. It offers a glimpse into the early implementation stage of EDUWEBTV and possibly charts directions for future improvement. In view that EDUWEBTV has only started in 2008 and is yet to take full force; there are still rooms for improvement. Based on the results obtained by the impact assessment study (Fong et al, 2009), there are immediate needs to look into the quality of instructional videos in EDUWEBTV, which are deemed as the heart of the educational portal. Literature reviews show that



technical characteristics, impact on learning, pedagogical aspects and ability to engage learners are some of the important elements in instructional medias.

Media Characteristics and Impact on Learning

Literature reviews revealed that media in teaching and learning can range from print to multimedia, audio, graphics, and data within a single computer workstation (Bates et al, 1992). The print medium, books, is the most conventional teaching and learning tool as it is one of the lowest cost one-way technology. However, print is static, non-interactive, may lead to passive and role learning (Fong et al, 2010). With the development in ICT, non-print multimedia-based technologies, such as instructional videos in the EDUWEBTV, are now regarded as cost-effective, interactive, effective teaching and learning tool. High quality graphics in the videos can increase the motivation of users, aid recall, and assist in the development of higher-order thinking and concept formation. Another important element in the videos that can capture the learners' attention and further stimulate their learning is the quality of audio effects. The other aspects of instructional videos, such as style of narration, control buttons, video screen size, documentation support and textual displays, combined with high quality video and audio effects may provide powerful interactive learning opportunities and enabling the delivery of global and real-life experiences to remote learners (Fong et al, 2010). With these media characteristics, instructional videos are believed to have the potentials to create a significant impact on students' learning. Hence, it is crucial to evaluate the technical qualities of instructional videos in EDUWEBTV in terms of video quality (e.g., color, speed, resolution, and camerawork), audio quality (e.g., clarity, speed, and volume), audio-visual synchronization, style of narration, graphic quality, background music, control buttons, video screen size, documentation support and textual displays.

Pedagogical Aspects

Founded on the principles of constructivism, teaching and learning in ICT-integrated learning environment should take into account the learner's prior knowledge, understandings and interest. According to Rossner-Merrill et al (1998) there are several strengths of constructivism, which include:

- Content can be presented from multiple perspectives using case studies
- Learners can develop and articulate new and individual representations of information
- Active knowledge construction is promoted over passive transmission of information.

Most educators acknowledge that instructional videos are a form of powerful communications medium. With its integration of visuals and audio in its presentation, concepts to be learned can be communicated more effectively and efficiently to the students (Fong et al, 2010). Students, thus, will be encouraged to construct new knowledge, reinforce their already developed knowledge structures, or challenge their existing understanding in a non-threatening and fun manner (Denning, 2000). Furthermore, when used together with other learning resources and instructional strategies, video can play a significant role in IT-integrated learning environment. In the context of EDUWEBTV, the video developers must understand and incorporate the principles of constructivism when designing the clips so that it can be used to optimize teaching and learning. Instructional designers ought to address their goals and intentions of designing instruction in order to best incorporate learning theory within their programs. This requires the designer to consider the learner's needs and characteristics as well as the learning content and context (Fong et al, 2010).

Learners' Engagement

Multimedia resources such as instructional videos in EDUWEBTV have the potential to serve as powerful ICT tools to engage learners in learning and to fulfill their needs and quest for knowledge. This is because video has the potential to engage learners through its interactivity and multimedia effects and makes learning experiences more interesting and motivating. Literature reviews show that there is a clear link between the use of ICT in teaching and learning processes and increased in learners' engagement (Inspectorate of Education, 2007). Engagement can be defined as the *energy in action*, which is the connection between person, content and activities during the teaching and learning processes ("Student Motivation and Engagement", 2010). Jones (2001) emphasizes that "student engagement appears to be a key element of effective schooling" (Pg 1). Past research on over 160 studies stated that learners'



engagement can be divided into cognitive, emotional and behavioral aspects (Fredricks et al, 2004; Richardson & Newby, 2004). For this reason it is crucial to ensure that the videos in EDUWEBTV are able to engage learners in these three aspects so that it can serve as an effective learning tool.

In order to substantiate the educational and pedagogical aspects of the instructional videos in EDUWEBTV, an evaluation of the video clips have to be carried out. Literature reviews suggest that the evaluation ought to cover the videos technical qualities, pedagogical aspects, learners' engagement and its impact on students' learning. The evaluators should be made up of experts in the field of multimedia and education as well as students who are the targeted users of this educational portal. This is in line with the Technology Acceptance Model (TAM) proposed by Davies et al (1989) which posits that the perception and beliefs of users are the key variables of technology acceptance. Four research objectives were formulated to guide this investigation.

Research Objectives

1. To evaluate the technical qualities of instructional videos in EDUWEBTV.
2. To evaluate the pedagogical aspects of instructional videos in EDUWEBTV.
3. To evaluate the extent to which the instructional videos cater for learners' engagement.
4. To determine the perceived impact of instructional videos on learning.

Methodology

A quantitative approach was employed to evaluate the EDUWEBTV videos in terms of technical qualities, pedagogical aspect, learners' engagement, and perceived impact on learning. The evaluation was carried out by a panel of experts (n=10) from a local university. These experts are well-versed in the areas of information technology, and educational studies. The panel of experts has evaluated a total of 72 (10.71%) videos out of 672 instructional videos available in EDUWEBTV. A preliminary analysis were carried out to categorize the video clips according to the channels involved (curriculum and instructional channels), school subjects and levels (Integrated Curriculum for Secondary Schools/KBSM and New Curriculum for Primary School/KBSR). Based on the statistics obtained, a stratified random sampling technique was employed to choose the videos for the evaluation purposes. As a whole, 56 (11.26%) out of 497 curriculum videos and 16 (12.30%) out of 130 interactive videos were analyzed. More than 10% of the video clips were sampled from each category, thus the results of the evaluation could be generalized. The evaluation undertaken by the panel of experts was grounded in the learning theories. It was built upon the constructivism principles that learners ought to actively construct knowledge through experiences gained in ICT-integrated learning environment. In other words, knowledge cannot be simply transmitted from teacher to learners but must be constructed individually by each learner.

Feedbacks were also obtained from a sample of secondary students (n= 1,120) regarding the quality and impact of instructional channel in EDUWEBTV on their learning. The distribution of samples according to school locality, grade level and gender is showed in Table 2. Cluster sampling technique was used to sample these students.

Majority of the samples, 86.43% (n=968), were taken from schools located at the urban area. The remaining samples were from schools located in the suburban (7.05%, n= 79) and urban (6.52%, n=73) areas. Out of the 1,120 samples, about 46.52% (n=521) were Form Four students. This was followed by 26.52% (n=297) of Form Two students and 19.46% (n=218) of Form One students. The number of students sampled from Form Three (5.00%, n=56) and Form Five (2.5%, n= 28) were much lower probably due to limitations in sampling as these were examination classes. The breakdown of samples according to lower and upper secondary levels was close to equal. There was 50.99% (n=571) of lower secondary students while upper secondary students accounted for 49.01% (n=549) of the total sample size. In terms of gender distribution, there were slightly more female students (57.77%, n=647) than male students (42.14%, n= 472). One student (0.09%) has skipped answering this question.



Table 2 Distributions of Samples According to School Locality, Grade Level, and Gender

	Percent (%)	Frequency (n)
School Locality		
Urban	86.43	968
Suburban	7.05	79
Rural	6.52	73
Total	100	1,120
Grade Level		
Form One	19.46	218
Form Two	26.52	297
Form Three	5.00	56
Form Four	46.52	521
Form Five	2.50	28
Total	100	1,120
Gender		
Male	42.14	472
Female	57.77	647
Total	99.91*	1,119*

Note: There was one missing data for gender (0.09%).

Even though instructional channels are divided into curriculum and interactive channels, the focus of students' evaluation was solely on interactive channel. This is because the channel is designed to encourage active and self-learning among students and help them to learn independently in school and at home, yet the usage of this channel is still considered low among students as compared to other channels (Fong et al, 2009). In view of the above mentioned reasons, students' feedbacks and perception regarding the interactive channel is particularly valuable for its future improvement. During data collection, the videos was randomly selected and showed to students in class or in computer labs. Evaluation was made after the video clips ended.

Two sets of questionnaire were employed in this study to obtain the required data. Set one was used by a panel of experts to evaluate the technical qualities, pedagogical aspects, and learners' engagement of the instructional videos in EDUWEBTV. The instruments consists of the Technical Qualities Scale (16 items), Pedagogical Scale (19 items), Learners' Engagement Scale (16 items). While set two was meant to obtained feedbacks from students regarding the technical qualities and perceived impact of interactive videos on their learning. Two instruments were used, namely the Technical Qualities Scale (8 items) and the Perceived Impact on Learning Scale (15 items). Validity of all the instruments was established through content validation by experts in the area concerned. The reliability of instruments, on the other hand, was ascertained through Cronbach's Alpha analysis. The values obtained for the scales involved ranged from $\alpha = .82$ to $\alpha = .89$. In order to confirm inter-rater reliability, a trial run evaluation was carried out by the panel of experts to standardize the approach and principles underlying the video evaluation.

Results

The results of evaluation on EDUWEBTV instructional videos are discussed in the aspects of technical qualities, pedagogical aspects, learners' engagement and perceived impact on learning.

Technical Qualities

A panel of experts (n=10) from a local university and a total of 1,120 students have evaluated the videos technical qualities. The panel of expert's rating is showed in Table 3. Sixteen items have been developed for this evaluating purpose. These items were technical features that serve as indicators of good quality video. It is a five point Likert scale, with responses range from "Very poor" (1) to "Excellent" (5). As shown in Table 3, 15 of the items have averaged rating greater than 3.0, that is, above the 'Satisfactory' rating.

The overall mean for the rating was $M=3.30$. This indicates that the technical qualities of the videos on average were rated as good by the team of evaluator. Item 11 "Sound effects are used to add emphasis to the visual tract of the video to enhance learning" has obtained the highest rating, with a mean of 4.23. The result suggests that most of the videos evaluated have 'good' to 'Excellent' sound effect. However, the technical feature with the lowest average rating of 2.57 was obtained for Item 15 on "Documentation support-Synopsis of video clip is present". This suggests that there is a need to provide clearer synopsis of the video clip to allow viewer obtain quick information about the video when making decision on selection of suitable videos for learning.

Table 3 Panel of Experts' Rating of Instructional Video Technical Qualities

Items	Very Poor	Poor	Satisfactory	Good	Excellent	Mean
1. Video quality (colour)	0.0%	23.0%	32.8%	36.1%	8.2%	3.30
2. Video quality (speed)	0.0%	13.1%	42.6%	34.4%	9.8%	3.41
3. Video quality (sharpness/resolution)	3.3%	18.0%	39.3%	23.0%	16.4%	3.31
4. Video quality (camerawork)	16.4%	18.0%	23.0%	29.5%	13.1%	3.05
5. Audio quality (clarity)	1.6%	14.8%	19.7%	47.5%	16.4%	3.62
6. Audio quality (Speed)	3.3%	13.1%	18.0%	50.8%	14.8%	3.61
7. Audio volume	6.6%	6.6%	23.0%	42.6%	21.3%	3.66
8. Audio-visual synchronization	1.6%	8.2%	21.3%	49.2%	19.7%	3.77
9. Style (narration)	6.7%	15.0%	21.7%	36.7%	20.0%	3.48
10. Graphics quality	5.0%	21.7%	25.0%	16.7%	8.3%	3.72
11. Sound effects	4.9%	8.2%	19.7%	27.9%	4.9%	4.23
12. Background music	3.3%	9.8%	18.0%	31.1%	11.5%	4.16
13. Control buttons	9.8%	6.6%	19.7%	41.0%	23.0%	3.61
14. Video screen size-	3.3%	27.9%	26.2%	24.6%	18.3%	3.26
15. Documentation support	28.3%	18.3%	26.7%	23.3%	1.7%	2.57
16. Text, titles, and other textual display	11.5%	18.0%	26.2%	21.3%	9.8%	3.39
Average						3.30

Table 4 shows the rating made by students ($n=1,120$) on the technical quality of interactive videos. The rating was made using a five-point Likert scale, with responses range from "Unsatisfactory" (1) to "Excellent" (5). Six out of eight items were rated greater than 3.0, that is, above the 'Satisfactory' rating. The overall mean for the rating was $M=3.13$. Item 8 "Relevance of the video clip's title" has yielded the highest mean score ($M=3.47$). This was not surprising as more than half of the students considered the relevance of the video clip title as good (31.30%) and excellent (19.60%). In fact, only 6% of them were unsatisfied with it. Another two items with quite positive responses were Items 5 "Matching of picture and sound in the video clip" and Item 7 "Description of content and duration of the video clip". Both of these items were rated by more than 40% of the students as good and excellent. More than 30% of them also rated the following items as good and excellent respectively:

- Quality of picture in the video clip (good=27.30%; excellent=10%)
- Size of the video clip when displaying (good=23.30%; excellent= 9.90%)
- Clarity of text displayed of the video clip (good=25.90%; excellent=11.10%)
- Quality of sound in the video clip (good=25.40%; excellent=13.30%)
- Quality of navigation buttons (good=21.70%; excellent=14.50%)
- Guidelines to download the video clips (good=20.50%; excellent=11.00%)

Nevertheless, students' mean ratings for size of the video clip was $M=2.99$ and guidelines to download the video was only $M=2.92$, which were below 3.00. The results imply that these two aspects were less than

satisfactory from the students' perspective. As a whole, both panel of experts and students have rated the technical quality of the videos quite positively. However, there are still rooms for improvement. In terms of synopsis, size of video clips and guidelines to down load the videos. From the experts' perspective, the synopsis of the video clips need to be revised and more detailed information has to be provided to help user select the appropriate videos for teaching and learning purposes. From the students' perspective, the size of the video clips and guidelines to down load the interactive videos are two technical aspects that required further improvement.

Table 4 Students' Rating of Interactive Video Technical Qualities

Items	Unsatisfactory	Poor	Satisfactory	Good	Excellent	Mean
1. Quality of picture in the video clip	12.70%	17%	33%	27.30%	10%	3.05
2. Size of the video clip when displaying	12.10%	19.80%	34.90%	23.30%	9.90%	2.99
Clarity of text displayed of the video clip	11.80%	18.30%	32.90%	25.90%	11.10%	3.06
3. Quality of sound in the video clip	15.70%	18.10%	27.50%	25.40%	13.30%	3.02
4. Matching of picture and sound in the video clip	9.80%	14.30%	32.40%	27.90%	15.70%	3.25
5. Quality of navigation buttons	10.50%	14.30%	39.10%	21.70%	14.50%	3.15
6. Description of content and duration of the video clip	8.50%	15.70%	33.80%	29.40%	12.70%	3.22
7. Relevance of the video clip's title	6%	11.90%	31.30%	31.30%	19.60%	3.47
8. Guidelines to download the video clips	15.70%	18.90%	33.90%	20.50%	11%	2.92
					Average	3.13

Pedagogical Aspects of the Videos

Apart from technical qualities, the pedagogical aspects of the videos is another critical element that was evaluated by the panel of experts. The evaluation was made by the team using a 19-item, 5-point scale, with responses range from 'Very poor' (1) to Excellent (5). The results is revealed in Table 5. The pedagogical aspects of the videos were compared by computing the average rating. Of the 19 items, only three items, Items 5, 12, and 14 have average rating slightly exceeded '3'. The remaining items all have average rating less than '3', which implies that most of the features on pedagogical aspects of the videos did not reach the 'Satisfactory' level. The overall mean for the rating on pedagogical aspects was M= 2.76.

Table 5 Evaluators' Rating on pedagogical aspects of the videos

Items	Very Poor	Poor	Satisfactory	Good	Excellent	Mean
1. Clear learning objectives	21.1%	26.3%	24.6%	28.1%	0.0%	2.77
2. Requires learner participation	25.5%	29.1%	32.7%	10.9%	1.8%	2.53
3. Uses constructivist learning approach	35.3%	21.6%	25.5%	15.7%	2.0%	2.83
4. Uses Inquiry-Discovery learning approach	38.5%	25.0%	17.3%	17.3%	1.9%	2.19
5. Uses real-world learning approach	28.6%	8.9%	10.7%	35.7%	16.1%	3.02



6. Suitable for mastery learning	21.4%	23.2%	23.2%	30.4%	1.8%	2.90
7. Supports creative thinking skills	30.2%	17.0%	24.5%	24.5%	3.8%	2.95
8. Supports critical thinking skills	28.8%	23.1%	23.1%	21.2%	3.8%	2.95
9. Inculcates noble values-	25.9%	10.3%	24.1%	31%	8.6%	2.78
10. Supports manipulative skills	45.7%	25.7%	8.6%	11.4%	8.6%	2.11
11. Helps learners to understand complex ideas and concepts	21.4%	19.6%	12.5%	33.9%	12.5%	2.96
12. Reinforces and expands learners' understanding of content/subject matter	16.7%	20.0%	16.7%	36.7%	10.0%	3.03
13. Increases motivation and enthusiasm to learn	25.4%	22.0%	10.2%	33.9%	8.5%	2.78
14. Video clip can be used without the aid of other instructional object	5.0%	20.0%	25.0%	38.3%	11.7%	3.32
15. Considers learners' background knowledge	13.6%	25.4%	15.3%	42.4%	3.4%	2.97
16. Promotes collaborative learning	40.0%	18.0%	32.0%	8.0%	2.0%	2.14
17. Encourages and stimulates discussion	27.1%	15.3%	27.1%	27.1%	3.4%	2.64
18. Asks/raises important questions	26.4%	22.6%	13.2%	30.2%	7.5%	2.70
19. Supports self-directed and independent learning	20.0%	18.3%	18.3%	30.0%	13.3%	2.98
Average						2.76

Note: Aspects that are non-applicable the video clip was not evaluated.

Learners' Engagement

The panel of experts has also evaluated the extent to which the instructional videos cater for learners' engagement using a 13-item, five point-likert scale. The responses may range from 'very poor' (1) to 'Excellent' (5). The characteristics were compared by computing the average rating of the items. The computation however, did not take into consideration the response 'Not applicable'. As shown in Table 6, the highest average rating obtained was 3.48 for Item 3, on "Makes content easy to understand". The lowest average rating was 1.47, for Item 10 "Helps learners with musical intelligence". The video clips have helped to make the content accessible to the learners but did not have the characteristics that help learners with musical intelligence. The overall mean rating for learners' engagement was $M=2.75$.

Table 6 Panel of Experts' Rating for Learner's Engagement

Items	Very Poor	Poor	Satisfactory	Good	Excellent	Mean
1. Video length/duration suits learning	0.0%	6.7%	18.3%	45.0%	30.0%	3.98
2. Stimulates interest to	18.3%	26.7%	13.3%	26.7%	15.0%	2.93



learn						
3. Engages learners in viewing the video	28.3%	18.3%	21.7%	20.0%	11.7%	2.68
4. Makes content/abstract concepts easy to understand	16.7%	21.7%	20.0%	28.3%	13.3%	3.00
5. Supports learners' active involvement in construction of concepts	23.3%	20.0%	28.3%	21.7%	21.7%	2.68
6. Provides useful examples to help learning	16.7%	20.0%	18.3%	21.7%	23.3%	3.15
7. Suits visual learners	20.0%	8.3%	11.7%	36.7%	23.3%	3.35
8. Suits auditory learners	19.0%	5.2%	12.1%	43.1%	20.7%	3.41
9. Suits tactile/kinesthetic learners	60.0%	23.3%	0.0%	6.7%	10.0%	1.83
10. Helps learners with verbal linguistic intelligence	30.8%	15.4%	11.5%	19.2%	23.1%	2.88
11. Helps learners with logical-mathematical intelligence	56.5%	13.0%	17.4%	4.3%	8.7%	1.96
12. Helps learners with musical intelligence	50.0%	10.7%	17.9%	17.9%	3.6%	2.14
13. Helps learners with spatial intelligence	41.9%	12.9%	25.8%	12.9%	6.5%	2.29
14. Helps learners with interpersonal intelligence	25.5%	13.7%	21.6%	23.5%	15.7%	2.90
15. Helps learners with intrapersonal intelligence	29.1%	12.7%	18.2%	25.5%	14.5%	2.84
16. Helps learners with naturalist intelligence	57.1%	14.3%	7.1%	14.3%	7.1%	2.0
					Average	2.75

Students' Perceived Impact on Learning

Students' perceived impact of the videos on learning is shown in Table 7. The responses could range from "Strongly disagree" (1) to "Strongly agree" (4). Findings showed that 48.3% of the students agreed that the usage of the videos has enabled them to develop their own understanding of a particular topic, 44.5% agreed on the aspect of 'encouraging them to actively discover new knowledge' and 42.4% agreed on the aspect of 'enabling them to understand a particular topic in a short period of time'. The findings also showed that slightly less than 40% agreed on the following aspects:

- Provide me with opportunity to view difficult, dangerous or costly experiment/activity (39.1%).
- Stimulate active discussion in class (39.3%).
- Make learning more fun (38.4%).
- Enable me to learn on my own (36.2%).
- Instill noble values in me (39.4%).
- Help me think critically (39.8%).
- Help me think creatively (39.7%).

Table 7 Students' Perceived Impact on Learning

Items	Strongly Disagree	Disagree	Agree	Strongly Agree	Mean
1. Enable me to develop my own understanding of a particular topic	14.7%	23.0%	48.3%	14.0%	2.62
2. Encourage me to actively discover new knowledge	12.6%	26.4%	44.5%	16.5%	2.65
3. Provide me with opportunity to view difficult, dangerous or costly experiment/activity	14.4%	30.2%	39.1%	16.3%	2.57
4. Stimulate active discussion in class	14.6%	29.4%	39.3%	16.7%	2.58
5. Make learning more fun	17.1%	26.3%	38.4%	18.2%	2.58
6. Enable me to understand a particular topic in a short period of time	14.6%	26.6%	42.4%	16.5%	2.61
7. Help me to understand complex ideas	13.0%	29.1%	40.7%	17.2%	2.62
8. Increase my concentration during the learning processes	14.0%	28.3%	40.6%	17.1%	2.61
9. Enable me to learn on my own	16.5%	31.7%	36.2%	15.6%	2.51
10. Increase my motivation to learn	13.3%	28.7%	40.5%	17.5%	2.62
11. Instill noble values in me	13.9%	28.2%	39.4%	18.5%	2.62
12. Enhance my problem solving skills	15.8%	27.9%	40.6%	15.7%	2.56
13. Help me think critically	14.9%	27.4%	39.8%	17.9%	2.61
14. Help me think creatively	13.3%	27.2%	39.7%	19.9%	2.66
15. Help me to improve my performance in related subjects	13.7%	24.5%	40.8%	21.0%	2.69
				Average	2.61

Discussion

Based on the evaluation made by a panel of experts (n=10) and 1,120 secondary students on instructional videos, various suggestions were drawn to improve the EDUWEBTV. Since technical quality of the videos serve as a strong determining factor in encouraging the adoption and continue usage of the EDUWEBTV programme (Fong et al, 2010), the feedbacks obtained from the panel of experts and students are valuable. Based on the findings, the synopsis of the video clips need to be revised and more detailed information has to be provided to help user select the appropriate videos for teaching and learning purposes. In order words, sufficient description of each video clip must be made available for the users. In addition, the video screen size has to be adjustable to meet individual needs as it was found to be less than satisfactory by the students. In order to help students optimize the usage of the videos, detailed and clear instructions must also be provided to help them download the clips as not all students are IT-savvy, particularly younger students at the lower grade level and those from the rural schools. Other than that, the videos should be recorded and streamed using higher definition format to improve colour, clarity, and stability. The quality camerawork can also be improved by varying types of shots and multiple camera angles. The videos designers should also fully exploit the special attributes of videos such as manipulation of time and space (e.g. slow motion or fast motion), which are still noticeably limited in the current videos.

From the pedagogical perspective, this study found that most of the features on pedagogical aspects of the videos did not reach the satisfactory level. Pedagogical improvements are needed as the use of instructional videos alone will not improve learning. Its usage must serve the teaching and learning purposes. As mentioned by Clark (1983), learning is only influenced by the instructional method, irrespective of which medium is used. Videos were merely considered as "vehicles that deliver instruction but do not influence student achievement any more than the truck that delivers our groceries causes changes in our nutrition" (Clark, 1983, p. 445). As such, it is recommended that the production of



instructional videos requires the collaboration of experienced experts from various sectors. Teachers, academicians, designers, technical experts and producers need to work together in producing the instructional videos. A good combination of expertise and skills are necessary for the production of effective instructional videos (Fong et al, 2010). In line with constructivism principles, the design of the videos should be planned in such a way that puts the students or the audience as the target group of learners. Learners' participation and engagement should be given priority. Apart from that, the strength of the videos ought to be fully utilized by displaying phenomena which are not possible to demonstrate in a normal classroom, such as real-life events or expensive and dangerous experiments.

The results on learners' engagement showed that the overall mean score was lesser than satisfactory. Hence, the videos must be improved to engage learners' cognitively, emotionally and behaviorally (Fredricks et al, 2004; Richardson & Newby, 2004). This is because learners who are engaged in learning cognitively are not passive receiver of information. On the contrary, they are active learners who construct their own understanding about the learning materials. They are able to pay attention during the teaching and learning processes and can connect the content to the real-life situation.

In addition, they are also able to reflect on the issues and questions posted to them, engage in problem solving, think critically, participate in discussions and are able to learn on their own without being overly dependent on teachers. Learners who are engaged in learning emotionally are interested to learn and enjoy schooling (Ainley, 2006). They are always motivated, curious and have a thirst for new knowledge. Learners who are engaged in terms of behavior are active participants in the teaching and learning processes. Given the opportunities, they like to take charge of their own learning. For instance they want to make decisions, solve problems and engage in self-assessment activities. In fact, these learners also have the needs to practice the skills that they have acquired. Based on these elements and findings from the study, the following are some of the key recommendations to improve learners' cognitive, emotional and behavioral engagement.

Cognitive Engagement:

- Makes abstract concepts easy to understand by using the unique attributes of video, e.g., capturing events with motions and sound that cannot be demonstrated in classroom.
- Translation for difficult words (vocabulary) or sentences has to be provided to help learners understand the content of the video clips.
- Video clips should not be merely a medium to present information. It should be a tool to enhance students' problem solving skills, help them to think critically, stimulate active discussions in class, make learning more fun and enable them to learn on their own. Based on students' responses, these elements are still inadequate. Hence, the content of the video clips must be redesigned.

Emotional Engagement:

- To fulfill learner's needs, the design of video clips (content, duration, technical aspects etc.) ought to take into account the targeted audience's age.
- Relevant real-life pictures, objects or animation can be increased to enhance learner's motivation and engagement during the teaching and learning processes.
- Introductions to all instructional videos should be replaced with quality Induction sets instead of the usual EDUWEBTV montages so that learners can relate the content with their prior knowledge and are curious to learn more.

Behavioral Engagement:

- Long videos should be provided with an interactive menu – this will enable learner control over video clips to be accessed.
- The Interactive channel must be interactive in nature to engage learners. For instance, question and answer session, games, puzzle as well as quizzes can be included. There should be pauses that enable reflection and proposals of issues and questions.
- The videos must capture images in action to provide useful learning experience to learners so that they are able to pick up the manipulative skills demonstrated in the video clips.



In terms of impact on students' learning, this study found that less than half of the students agreed that the videos in EDUWEBTV were able to provide them with opportunities to view difficult, dangerous or costly experiments or activity. Moreover, the videos also have limitation in terms of stimulating discussions in class, making learning fun as well as promoting self-learning, critical and creative thinking. In order to overcome these shortcomings, recommendations put forth to improve the technical, pedagogical and engagement aspects of the videos must first be undertaken. With the improvement in such aspects, a more positive impact on learning will naturally be attained.

Conclusion

The instructional videos in EDUWEBTV have great potentials to be utilized as an effective teaching and learning tool in schools. Nevertheless, the videos must constantly undergo evaluation, modification, and improvement to keep abreast with the current knowledge, capabilities and demands of learners as well as the development in ICT. With such steps taken, EDUWEBTV will be able to meet the demand as a resource that is aligned to Malaysian and global standards, and establish itself as a major contributor in enhancing the quality of teaching and learning in Malaysian schools, regardless of geographical locations as envisaged by the Ministry of Education.

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