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Exploring the effects of motivational videos for hearing-impaired children

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Abstract: Videos is elaborately designed for certain discipline knowledge and skill development to support varieties of learning. The videos for hearing-impaired children, regards vivid videos as the main carriers which conform to cognitive learning rules of hearing-impaired children. For one thing, it is able to cultivate learning interests along with active learning abilities of hearing-impaired children. For another, it has theoretical significance and application values on the improvement of their learning effect and cognitive learning abilities. This study attempts to employ Attention, Relevance, Confidence, Satisfaction motivation model for hearing-impaired children, hyperlink technology to design learning contents and presentation of teaching videos, which was called motivational videos. In this study, a quasi-experiment was conducted to examine the effects of hearing-impaired children learning motivation and cognitive attitude of learning environment. This results indicated that the strategies of the videos for the hearing-impaired children could effectively strengthen learning motivation and promote positive learning behavior in hearing-impaired children.
Keywords: Hearing-impaired children, motivation, video, effect

1. Introduction

With the development of educational technology, the research on video-based learning has seen growth in the last years (Giannakos, 2013). Videos have the potential to be used as cognitive tools for knowledge construction (Delen, Liew, and Willson, 2014) particularly for helping learners articulate and relate their understandings to make sense of abstract concepts (Anderson & Barnett, 2011) . Videos can provide a motivating and engaging environment positively promoting active learning in the cognitive development and socialized development of the hearing-impaired children (Annetta, Minogue, Holmes, & Cheng, 2009). The impacts of engagement, according to researchers (Infante et al., 2009), become great only when learners engage in actively constructing, integrating, and monitoring knowledge. Even though videos possess a number of merits that foster learning, researchers (Becker, 2007; Gee, 2003) have indicated that what underlies the success of game-based learning is the pedagogical foundation of the videos. There is a necessity for more research to examine the effects on learning of integrating learning theories or instructional strategies into videos. These three dimensions play an important role in students' learning activities. As researchers (Annetta et al., 2009) have suggested, engagement (e.g. behavior) alone does not necessarily promote learning gains; it is cognitive engagement that matters. Thus, this study intended to probe hearing-impaired students' cognitive engagement in answering self-explanation prompts.

Mich, Pianta, and Mana (2013) proposed that words should be displayed on the screen together with an image illustrating their meaning in the application for deaf students. A web-based literacy application was introduced, which helped hearing-impaired children to work on their reading comprehension skills (Mich, Pianta, & Mana, 2013). In addition, based on the principle of potential development and compensation, videos for the hearing-impaired children can enrich learning environment by creating images and visual information, which provide them more channels to get

information. What's more, it is an effective approach to promote the abilities of language comprehension and expression, attaching great importance to discover their visual potential.

With regard to the popularization of basic knowledge and the training of bilingual communica tion skills, the videos possess more hearing-impaired compensatory than common videos. The videos are of great significance for the hearing-impaired schools to enhance knowledge and skill teaching by going full scope to the advantages of videos visual information communication. Perceiving that hearing-impaired children to some extent relied on vision, Roccaforte, DeMonte, Groves, Tomasuolo, and Capuano (2011) built an e-learning system based on the combination of visual aids and texts. Besides, the hearing-impaired children are exposed to aesthetic emotion in the videos. Hence, the videos are beneficial to raise the learning interests as well as to accumulate learning resources for hearing impaired children.

This study attempts to establish a motivational videos learning environment and employs Keller's theory (i.e., Attention, Relevance, Confidence, Satisfaction motivation model), hyperlink technology to design learning contents and presentation of teaching videos for hearing-impaired children, which was called motivational videos. Keller's theory (1983) is represented by what has become known as the ARCS model (Keller, 1984, 1987a, 1999b) based on the acronym resulting from key words representing the four categories (attention, relevance, confidence, and satisfaction). Specifically, these four categories are not only high correlated to each other especially in the terms of the process of personal motivation, but also in a progressive relation.

Recently, the ARCS model was expanded and many studies have studied the relationship between the motivation and volition. ChanMin & John (2011) found that MVEM (motivational and volitional email messages) can serve as an effective tool for facilitating preserves teachers' positive attitudes toward technology integration. John (2008) made efforts to help explain relationships among theories in relation to motivation, volition, learning, and performance. According to John (2008), the theory of motivation, volition, and performance (MVP) was built upon an established integrative theory which provides a basis for cross-paradigm studies. Via an online simulation, Elena (2014) has found that student's interest and curiosity toward the earning environment had the highest positive predicting power on students' satisfaction, while the volition processing variable had the lowest predicting power. ChanMin & John (2008) incorporated volitional support in the form of study tips, along with the motivational components of the messages. According to Angela, the use of augmented reality technology on learning environments had a positive effect on the motivation of middle-school students.

In addition, the five principles of motivation was described as follows:

- Motivation to learn is promoted when a learner's curiosity is aroused due to a perceived gap in current knowledge.
- Motivation to learn is promoted when the knowledge to be learned is perceived to be meaningfully related to a learner's goals.
- Motivation to learn is promoted when learners believe they can succeed in mastering the learning task.
- Motivation to learn is promoted when learners anticipate and experience satisfying outcomes to a learning task.
- Motivation to learn is promoted and maintained when learners employ volitional (self-regulatory) strategies to protect their intentions.

To summarize, the ARCS model emphasizes more practical instructional approaches, which makes it different from those only define the motivation's type and content on a theoretical level. The ARCS model proves that in order to have motivated students, their curiosity must be aroused and sustained; the instruction must be perceived to be relevant to personal values or instrumental to accomplishing desired goals; they must have the personal conviction that they will be able to succeed; and the consequences of the learning experience must be consistent with the personal incentives of the learner. This model not only improve student's motivation, but also emphasizes the significance of the persistence of personal motivation. In last decades, the ARCS model has been supplemented by other factors such as the students' volition and performance and more studies will make efforts to supplement it through put this model into practice. Overall, the ARCS model provides support in terms of the theoretical level and the practical level in our study. On a theoretical level, it reveals the essence

of the design of learning resources and learning style for hearing-impaired children. On a practical level, the ARCS model may support the instructional design for hearing-impaired children.

2. Method

2.1 Participants

Some terms such as hard of hearing, hearing loss, deaf or hearing impairment are often used to describe that a person can't hear clearly or can't hear anything. The respondents of this study were the hearing-impaired children who were accepting compulsory primary education. They were informed that the right to withdraw from the survey at their own free.

2.2 Instruments

The ARCS questionnaire developed by Keller (1987) was utilized to investigate the application effects of videos embedded self-explanation for hearing-impaired children. There were four scales in this questionnaire, including the 'attention', 'relevance', 'confidence', and 'satisfaction', which had become known as the ARCS model. In the dimension of 'attention', three scales (perceptual arousal, inquiry arousal, and variability) were involved to test whether the self-explanation design of video learning can gain learners' attention. While 'goal orientation', 'motive matching' and 'familiarity' were three scales in the dimension of 'relevance'. Also, weather the videos could help hearing-impaired students gain confidence were tested by three aspects—learning requirements, successful opportunities, and personal responsibility. At last, the dimension of satisfaction were consisted of 'intrinsic reinforcement', 'extrinsic rewards', and 'equity'. The questions of the four scales were stated with regard to the premise, "What were the impacts of embedding collaboration into a video with a self-explanation design on supporting the acquisition of learning concepts for hearing-impaired children?" These are the sample items of the four scales:

- Attention: I feel confident that I will do well in this course.
- Relevance: I do not see the content of this course relates to anything I already know.
- Confidence: Whether or not I succeed in this course is up to me.
- Satisfaction: I feel that this course gives me a lot of satisfaction.

3. Result

The section presents and discusses some of the preliminary data analysis results, including learning performance and efficacy.

3.1 Effects on learning performance

From the analysis of Independent-samples T test of pre-test learning performance, there is no significant difference between experimental group and control group (t=1.038, p=0.300). According to the analysis of Independent-samples T test of post-test learning performance, t=8.355, p=0.000. Meanwhile, the analysis of Cohen's d difference between experimental group and control group showed effect size=0.65. Therefore, compared with the control group, the learning performance of experimental group learners have significant increased.

Table1. Learning performance of pre- and post-test

		experimental group N=42	**control group N=41**
Pre-test performance	Mean	20.13	21.24
	Standard Deviation	13.617	14.088
	Interval	[0, 80]	[0,70]
Post-test performance	Mean	86.31	82.44
	Standard Deviation	4.798	6.874
	Interval	[60, 96]	[40,96]

3.2 Effect on learning efficacy

This study use analysis of variance (ANOVA) to investigate the different effects on learning efficacy between experimental group and control group. As ANOVA of the overall efficacy results are: $F = 260.99$, $p < .001$, $\eta 2 = .239$; ANOVA results of "attention": $F = 171.95$, $p < .001$, $\eta 2 = .157$; ANOVA results of "relevance": $F = 58.83$, $p < .001$, $\eta 2 = .069$; ANOVA results of "confidence": $F = 82.79$, $p < .001$, $\eta 2 = .108$; "satisfaction " with an ANOVA results: $F = 42.57$, $p < .001$, $\eta 2 = .066$. Therefore, experimental group learners have higher learning efficacy than control group at all-time points checked (Table 2). In another word, the results prove that the systematic design strategies integrating ARCS into videos have positive effects on learners' learning efficacy.

This research investigated the effects of strategies of integrating ARCS into videos. Overall, our findings are in substantial agreement with those of Halverson's study. Halverson(2006) reported that the effective combination of different forms activities, such as asynchronous discussions, video lectures, group learning and evaluation is very important in the blended learning process of university humanities courses(Halverson, 2006) . The data reported here suggest that the overall improvement of instructional effectiveness and learning performance may be brought up by the systematic design strategies integrating ARCS into videos have positive effects on learners' learning efficacy, which enabled learners' active knowledge building process in a relaxed, interesting, highly-engaging and interactive atmosphere, and helped to arouse learners' learning enthusiasm and foster their collaborative and communication capabilities.

Table2. ANOVA of learning efficacy of experimental group and control group

Dependent Variable	F	Sig.	Partial Eta Squared	Observed Power(a)
overall efficacy	260.99	.000	.239	1.000
attention	171.95	.000	.157	1.000
relevance	58.83	.000	.069	1.000
confidence	82.79	.000	.108	1.000
satisfaction	42.57	.000	.066	1.000

4. Discussion

Gibbs (2004) proposed that vocabulary knowledge and phonological awareness of hearing-impaired children was associated with their reading. Similar to his study, the finding of this study indicated the videos and videos improve their knowledge system. Researchers have illustrated varieties of ways to help the hearing-impaired children so that they could enhance their abilities of cognitive comprehension. For instance, Hao and Su (2014) utilized two emotion recognition tasks and discovered that the deaf children were capable of recognizing emotion which is clearly conveyed by facial or body expressions. Additionally, an experimental study conducted by Debevc, Stjepanovič, and Holzinger (2014) revealed that sign language streaming videos together with subtitles could enable the hearing-impaired children to have a better understanding of knowledge online. Moreover, even though not merely aimed at the hearing-impaired children, the text-based reflection prompt strategy has been proven effective in a classroom context (Hung & Yang, Fang, Hwang, &Chen, 2014). Furthermore, Mich, Pianta, and Mana (2013) put forward some ideas that rich and colorful illustrations are attractive for young people. This study combined the features mentioned above, to establish a series of learning strategies for the hearing-impaired children. In this study, the visual design plays an essential part in the videos in order to make up for the hearing deficiency.

As mentioned earlier, learning motivation may be strengthen so that hearing-impaired students can gain the most effective learning under a personalized and adaptive interactive environment. Chen (2014) proposed strategies of perfecting teaching design to increase the interests of the hearing-impaired children. According to the cognitive psychological characteristics of hearing-impaired children, they are more likely to accept the things which are familiar to them. Therefore,

different from previous studies, this study designed the videos close to their life, especially adopting the contemporary host with hearing impairment.

5. Conclusion

This results indicated that the strategies of the videos for the hearing-impaired children could effectively strengthen learning motivation and promote positive learning behavior in hearing-impaired children. This research constructed a development strategy of the videos for the hearing-impaired children. For example, the principles of determining theme are hearing-impaired children-centered and goal-oriented. And it suggests that the creation of the scenarios could stimulate the motivation of hearing-impaired children. Based on the principle of defects compensation, clever using visual thinking may guides them make a thorough inquiry. Moreover, integrating the intimate sign language into expression may allow an improvement of the participation of hearing-impaired children. The last strategy is that the videos developers should focus more on the visibility with the package of videos and audio.

This study aimed to propose the development strategies of education videos for hearing-impaired children. At present, the theoretical research on videos production for hearing-impaired children are not enough to form a set of effective operation process in academia. In particular, the studies on exploring the development strategies of videos from the cognitive psychological characteristics of hearing-impaired children remain inadequate. This study embarked from the learning requirements of hearing-impaired children, guiding by the language teaching outline of the hearing-impaired schools. Additionally, combining with the characteristics of the courses and the learners' cognitive levels, this study analyzed and integrated related videos resources for the hearing impaired children. According to these strategies, the videos fully made use of all kinds of videos elements to establish situations, stimulating students' interests. What's more, not only did it enrich visual learning resources of the hearing-impaired children, but also it cultivated the consciousness and abilities of verbal communication of hearing-impaired children.

Less videos was aimed at hearing-impaired children. The strategies, which are proposed to develop videos aimed at hearing-impaired children, still need completing gradually. Future research needs to analyze the specificity of hearing-impaired education. In addition, future research should give insight into the relationship between natural sign language and Chinese as well as their application in the videos, which contributes to improving and optimizing the development strategies of videos. The samples of respondents were limited. It was remarkable to foster the cognitive characteristics of hearing-impaired children that were regarded as vulnerable groups, which was good for making videos. Based on the research, it was significant to improve their learning equality and media environment.

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