INTERACTIVE VIDEO FOR AUTISM CHILDREN LEARNING BAKERY: USING GAGNÉ NINE EVENT AS A METHOD OF DELIVERANCE

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ABSTRACT

Interactive video in learning can help to gain student attention as well as provide them a meaningful learning. A project based on using an interactive video to help autistic children to learn bakery was developed by using ADDIE model as the framework and Gagné Nine Events as a method to deliver the instructional material to the autism children. Although interactive video can be a good instructional tool to deliver instructional material a few special requirements were needed to be taken during its developments as autistic children style of learning are different than normal children.

Keywords: interactive video; instructional design; autism

1. INTRODUCTION

An interactive video (IV) prototype to teach autism children bakery was develop using ADDIE model as its framework because of the iterative nature of the model. Gagné Nine Events was used as the method to help in delivering the instructional material in the IV as it can help to deliver meaningful learning experience to the children.

1.1. What Is Instructional Design

Gustafson and Branch described the instructional design as a system of procedure for developing education and training programs in a consistent and reliable fashion. Furthermore, he also stated that instructional design is a complex process that is creative, active and iterative. Although the exact origins of instructional design (ID) process can be debated, there is an early attempt to apply general systems theory by Silvern (Silvern, 1965) and Bertalanffy (Von Bertalanffy, 1968)system analysis as an approach to solving problems. Silvern was particularly interested in how general systems theory could be used to create an effective and efficient aerospace and military training and published what might be considered the first ID model.

The writings of Branson (Branson, 1978)stated that the use of instructional system design (ISD) methods has been commonly used in all branches of the military by the early of the 1970s and had started to appear in industrial and commercial training applications. During the 1970s, ISD became accepted as a standard training methodology in the much large organization and now is used throughout the world.

Silvern's model and practically all other early ID models were based on behaviorism which is broadly defined as the philosophy and values associated with the measurement and study of human behavior. Although now much-associated behaviorism with B.F. Skinner and stimulus-response theory, most of the early writers held far more encompassing theoretical and philosophic perspectives. Early behaviorist believed as many ID practitioners believe today, that a wide variety of behaviors can be observed, measured, planned for, and evaluated in many ways that are reasonably reliable and valid. Cognitive psychologist, particularly the perspective of information (Gagne & Wager, 1992), have also made major contributions to the underlying theory of instructional design (Gustafson &

Branch, 2002).
Although a variety of systematic instructional design processes have been described, all the descriptions have the same core elements of analysis, design, development, implementation, and evaluations (ADDIE) to ensure congruence among goals, strategies, evaluation and the effectiveness of the resulting instruction. Figure 1 represents one way to depict the relationship of ADDIE.
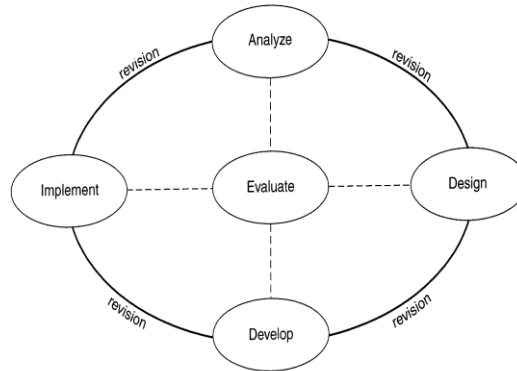
Figure 1: ADDIE Elements Relationships

1.2. What Is Autism

Autism is a complex biological disorder that generally lasts throughout a person's life. It is called a developmental disability because it starts before age three, in the developmental period, and causes delays or problems with many different ways in which person develops or grows(Willis & Ph, n.d.).

Autism is conceptualized as a behavioral syndrome of multiple neurological injuries associated with a wide variety of medical conditions. The possibility that the brain dysfunction might underlie a specific lack of a theory of mind is discussed. Autism is seen as possibly existing on spectrum disorders including both Kanner autism and Asperger Syndrome(Gillberg, 1990). These autistic children are known to be diverse in the group and the manner of how the autism manifests in each child is different as well(Siegel, 2003). Figure 2 shows the five main types of autisms and their characteristic(Adly, Noor, Shahbodin, & Pee, 2012).

Types	Characteristic
Autistic disorder	Markedly abnormal or impaired development in social interaction and a markedly restricted repertoire of activity and interests, usually noted within the first years of life.
Asperger's syndrome	Severe and sustained impairment in social interaction and the development of restricted, repetitive patterns of behavior, interests and activities. No clinically significant delays in language acquisition.
Rett's disorder	A specific and highly distinctive pattern of development regression following a period of normal functioning through the first five months after birth. Has been diagnosed only in females.
Childhood disintegrative disorder	Marked regression in multiple areas of functioning following a period of at least two years of apparently normal development.
Pervasive developmental disorder not otherwise	Severe and pervasive impairment in the development of reciprocal social interaction, but the criteria is not met for a specific pervasive developmental disorder.

Figure 2:Type of Autism (Adly et al., 2012)

Autism spectrum disorder (ASD) is a group of neurodevelopmental disorders comprising autistic disorder and related but less severe disorders: Asperger disorder and pervasive developmental disorder not otherwise specified (PDD-NOS). Children who have ASD exhibit characteristic impairments in social interactions and communication and restricted, repetitive, and stereotyped patterns of behavior (Kogan et al., 2009).

1.3. Interactive Video

Interactive video (also known as "IV") is a type of digital video that supports user interaction. These videos play like regular video files but include clickable areas, or "hotspots," that perform an action when you click on them. For example, when you click on a hotspot, the video may display information about the object you clicked on, jump to a different part of the video, or open another video file(P, 2011). In an instructional sense, the interactive video may be defined as "any video program in which the sequence and selection of messages are determined by the user's response to the material"(Schaffer & Hannafin, 1986).

1.4. Using Interactive Video as Learning Tools

The increased interaction with multimedia content has been recognized as a significant factor to improve learners' learning outcomes. As a result, interactive video lectures are increasingly being adopted in digital learning contexts for increasing interactivity(Hung, Kinshuk, & Chen, 2018). Use of video lectures has significantly increased in recent years in online courses because of the improvements in the Internet infrastructure to support high bandwidth streaming content. Literature suggests that video lectures contribute to better learning performance, compared to only reading-based learning content. Interactive video lectures are therefore being gradually adopted in digital learning contexts such as flipped classrooms, massive open online courses, and electronic textbooks[14-18]. Interactive learning activities (ILAs) embedded in between video clips provide the learner-content interaction and are essential for creating an interactive video(Hung et al., 2018). Through interactive video, the learning experience with rich learner-content interactions can increase learners' engagement and enjoyment(Deslauriers et al., 2011). Compared with reading-based content, video lectures have higher media richness, which helps learners comprehend complicated learning concepts and improve their learning performance. It also helps satisfying learners' expectations for more interactive and abundant learning experience than just learning solely with non-interactive video(Deslauriers et al., 2011).

2.   METHODOLOGY

This project was develop based on ADDIE model as the main framework. Its name is an acronym of the capital letters of the words: Analyze, Design, Develop, Implement, and Evaluate(Mohd & Shahbodin, 2015). To deliver and prepare this interactive video project for autism children in learning bakery, Gagné's Nine Events was used as a method of instruction to make the interactive video for appeal to the children.

2.1. ADDIE Model

ADDIE model has five phases systematic model used to create sound instructional products for a variable setting. In each phase, the instructional designer makes the decisions that are critical for ensuring the effectiveness of the instructional experience(Ku et al., 2014). Each phase of the model has an important element of constructing the instructional design process. In each phase, the instructional designer makes the decisions that are critical for ensuring the effectiveness of the instructional experience(Mohd & Shahbodin, 2015). The ADDIE five steps each represent a guideline that can help in building instructional material.

Analyze where the analysis of the project requirement, user characteristic and requirements, task that need to be learned and special requirement based on this project. Design where the design idea is generated, the objective of the project is developed and choose an instructional approach to help to deliver this design.

Developed is the phase where the instructional material is created. In this phase sometimes can either be prototype or final product is developed. Implementation is when the instructional material is being delivered or distributed to the learners or users.

Evaluation phase involving the developers taking feedback from users based on their experience to make sure that the instructional materials achieved the desired goals and used the result to improve the product for future use.

2.2. Gagné Nine Events

Robert Gagné proposed a series of events which follow a systematic instructional design process that shares the behaviorist approach to learning, with a focus on the outcomes or behaviors of instruction or training. Each of the nine events of instruction is highlighted below, followed by an explanation of how each of the steps can be used to create instructional materials.

The following nine steps have been adapted from (Gagne & Wager, 1992).

1. **Gain the attention of the users.**
   The most important things first are to gain your audience attention. Do this by creating a compelling subject that can hook them from the start. Shows a good story, make awesome animations or questions that can surprise them. Audiences who are stimulated by these activities tend to stray their attention to the topic given.

2. **Inform users of the objectives.**
   State the goals or the objectives of the audience before they start to help them gain an idea of what they will learn and the outcomes that they will get.

3. **Stimulate recall of prior learning.**
   Help audiences make sense of new information by relating it to something they already know or something they have already experienced. Ask them questions about their previous experiences.

4. **Present the content.**
   Use strategies to present and cue lesson content to provide more effective, efficient instruction. Organize and chunk content in a meaningful way. Provide explanations after demonstrations.

5. **Provide learning guidance.**
   Even the most advanced users may need support when it comes to learning new skill sets and absorbing new knowledge. Otherwise, they may become discouraged or frustrated and disengage from the topic altogether. Gave them advice or aids to help them navigate through the topic.

6. **Elicit performance (practice).**
   Practice makes perfect. Gave them opportunities for them to apply knowledge that they have learns. Offer them branching scenarios and simulations that give them the chance to see where their decisions lead them, as well as the rewards and risks involved that come of their actions.

7. **Provide feedback.**
   Give learners timely and constructive feedback to help them improve learning behaviors and identify their weaknesses and strengths. Offer personal feedback, rather than giving general praise or criticism to the entire audience, so that every learner knows which steps they must take to reach their goals.

8. Assess performance.

In order to evaluate the effectiveness of the instructional events, you must test to see if the expected learning outcomes have been achieved. Performance should be based on previously stated objectives.

9. Enhance retention and transfer to the job.

The audience must always be aware of how they can apply what they have learned once they finished their learning. As such, you should include real-world scenarios, stories and other learning capabilities that show them the applications of the information and skills they've worked so hard to develop.

3. RESULT and DISCUSSION

Usability evaluation was conducted to test user's opinions about the effectiveness of the interactive video in teaching autism children bakery. Usability inspection is the generic name for a set of cost-effective ways of evaluating user interfaces to find usability problems. They are fairly informal methods and easy to use(J. Nielsen, 1994). Usability inspection is aimed at finding usability problems in a design(Mack & Montaniz, 1994), though some methods also address issues like the severity of the usability problems and the overall usability of an entire design(J. Nielsen & Phillips, 1993).

To test the project usability evaluation, a group consisting of 10 respondents from the multimedia background were asked to test the project prototype for a couple of days. They were then, asked about usability issue that they encounter during the test period. They were given two sets of questionnaires with one asking about whether the project follows the Gagné Nine Events and another set was based on usability evaluation. They were asked to rate the project with 1(not satisfy) until 5(satisfy). Table 1 and Table 2 shows the results from the questionnaires.

Table 1: Gagné Nine Events Evaluation

Gagné Nine Events	1	2	3	4	5
Gain attention of the users	-	-	2	4	4
Inform users of the objectives	-	2	3	3	2
Stimulate recall of prior learning.	-	5	5	-	-
Present the content.	-	1	4	2	3
Provide learning guidance.	-	2	2	4	2
Elicit performance (practice).	-	2	5	3	-
Provide feedback.	1	3	3	3	-
Assess performance.	-	-	3	3	4

Enhance retention and transfer to the job.	-	3	4	2	1

Gagné Nine Events	1	2	3	4	5
Respondent's Satisfactory (%)	1.11	20	34.44	26.67	17.78

Table 2: Usability Evaluation

Usability questions	1	2	3	4	5
Visibility of the content	-	-	2	3	5
User control and freedom	-	1	2	3	4
Consistency	-	-	2	2	6
Recognition rather than recall	-	1	4	2	3
Accessibility & Learnability	-	2	1	3	4
Flexibility & Efficiency	-	2	1	4	3
Aesthetic	1	3	3	2	1
Effectiveness & Satisfaction	-	-	1	3	6

Usability Evaluation	1	2	3	4	5
Users satisfactory (%)	1.25	11.25	20	27.5	40

Based on the result in Table 1 only 44.45 percent respondents rated satisfied that the project is following the Gagné Nine Events while 21.11percent respondents rated that the project does not follow the Gagné Nine Events. For usability evaluation, 67.5 percent of respondents rated that the project does satisfy them on the usability term while 12.50 percent did not satisfy with the usability of the project.

4.   CONCLUSIONS

There still a few improvements that can be made to this project in the future in order for it to fully follow Gagné Nine Events method of deliverance. Using an interactive video as a medium for learning can very good for autism children as it not only has visual aids, it also has auditory aids and kinesthetic learning. They also can practice their knowledge with quizzes along the way and there are several segments that can be clicks during the video when they having problems understanding the contents.

Using Gagné Nine Events can really help to deliver instructional material to students as it follows a systematic instructional design process that shares the behaviorist approach to learning, with a focus on the outcomes or behaviors of instruction or training. This combine with ADDIE model as a framework to build an instructional material can really help in developing a great instructional material

5. ACKNOWLEDGEMENT

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