Chapter in Book

JBS Module : Humanizing Education through Edutainment

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Abstract: *The purpose of this study is to determine the impact of the Jom Bijak Sains Module on Higher Order Thinking Skills for 5th-year pupils. The study uses a quasi-experimental design using pre and post-tests. The development of this module is based on ADDIE models comprising the analysis phase, design phase, implementation phase, evaluation phase, and implementation phase. The assessment phase involves five experts in science to verify the content and usability of the module. The samples were 33 treatment group students and 33 control group students randomly selected.The instruments used are pre-test and post-test. The results showed that there was an increase in achievement in both treatment and control groups. However, the treatment group showed significantly higher achievement compared to the control group. Based on the finding of the independent sample t-test results for high-level thinking skills there was also a significant difference [t (66), p <.05)] between the post-treatment and post-control test scores of p = 0.00. In conclusion, this study found that the Jom Bijak Sains module is effective in improving the higher-order thinking skills of Year 5 students. The impact of the study shows that this module can be used by primary school science teachers to improve the Higher Order Thinking Skills of year 5 pupils.*

Keywords: Edutainment; Higher Order Thinking; Module; Quasi-experimental

1. INTRODUCTION

Contemporary global development and challenges require educational institutions to adopt a conscious and purposeful scientific method in facing these challenges and this rapid development and, invest active human energies in developing educational performance flexibly and efficiently. One of the most appropriate educational methods is learning by entertainment which has become a distinctive feature in the educational field.

Okan (2003) explains that edutainment is a hybrid type of education that relies heavily on visual materials and forms of narration and game-like forms. Nasr (2019) believes that edutainment is a strategy suitable for a fast lifestyle and commensurate with the needs of learners, through which they learn without boredom and monotony, as it develops some of their mental and practical skills, enriches their experiences, and makes their learning of science more fun.

Edutainment acquires its importance through the clarity of its primary objective, as Okan (2003) and Aksakal (2010) explained that edutainment aims to attract learners' attention and make their focus on events and learning materials during their learning. Kakal (2015), Kusmarni (2017), and Nasr (2019) added that edutainment has two wings: education and entertainment, where entertainment and play are used in learning. Ksakal (2015) added that this leads to the learners' enthusiasm, helping them to learn complex materials and making the organized topics and information more enjoyable.

Given the importance of this strategy, some studies have used it in teaching different subjects at all education levels, aiming to develop several dependent variables such as Rahman, Kasinathan, Logeswaran & Taharim (2017), Abdualhamed, Shair, Shayib & Algool (2017), Abu Hilal (2018), and Nasr (2019).

Abu Rajab (2012) mentions that science is one of the most important subjects that help increase learners' abilities to understand facts and acquire knowledge and many mental, practical, and social skills. However, its teaching faces many problems, the most prominent of which is the use of traditional methods and strategies by teachers that limit students' activity, interaction, and academic integration and do not suit their tendencies and needs, which results in a kind of indifference, and unwillingness to learn science subject (cited in Nasr, 2019).

Jones (2011) confirms that edutainment is a therapeutic method that helps solve many problems and disorders that some students suffer from that may affect the process of learning science, most notably anxiety and fear of error that some students feel because of the difficulty of the material or the fear of making a mistake. Bulunuz (2015) believes that the enjoyment of learning while studying science through entertaining tasks and activities arouses joy and happiness among the learners. Also, it encourages and supports them, providing a healthy and safe environment in the classroom, as well as teamwork that helps push learners towards studying science in a fun way—all of this increases the involvement of both teachers and learners in science lessons.

In addition, the TIMSS and PISA international standards, which assess students' proficiency in science and mathematics, provide evidence that pupils are prepared to make use of HOTS. Studies show that many educators feel today's students lack the ability to think critically and creatively deal with problems (Fensham & Bellocchi, 2013; Gough, 2014; Haahr, 2005; Ritz & Fan, 2014; Siew, Amir, & Chong, 2015). Hence, many experts in the field of education think it's crucial to rethink the way classes are taught in schools today (Fensham & Bellocchi, 2013; Gough, 2014). Yet, students' constant misunderstanding of science (Kurniawan & Maryanti, 2018; Suma et al., 2019) leads to mental anguish and negatively impacts their academic performance (Nixon & Rackebrandt, 2016). So, the goal of this research is to create an edutainment module that can help students evaluate complex scientific concepts and their practical applications. This module was also made so that educators may present the subject matter without spending excessive amounts of time on lesson plans.

2. METHOD

This study also aims to test the effectiveness of the module before and after the improvement. To fulfill this purpose, the evaluation of the appropriate module is carried out using the experimental method. Experimental research design is the best comparative study design between groups (Chua, 2006). This study focuses on respondents who have moderate or poor achievement in Science since the research sample used is a sample that has been screened in the existing group (class). This study uses a pre-post comparison test design between the treatment group and the control group (Nor Aizal Akmal, 2015; Azmiza Ahmad et al., 2014; Mohd Hasril Amiruddin, 2014; Saripah Salbiah Syed Abdul Azziz et al., 2013) as well as a form of post-test comparison between the treatment group and the control group to test the effectiveness of the module before and after improvement. The post-test design is considered simple but has high internal validity (Chua, 2006). The design of this study is shown in Table 1.

Table 1. Research Design

Sample	Group	Pre test	Treatment	Post test
Year 5	Treatment	Yes	Yes	Yes
Year 5	Control	Yes	No	Yes

The experimental group in this study is the group that uses the JBS module. The control group for this study is the group that undergoes the conventional learning process. A control group was created to obtain a mean score for conventional learning at school and an experimental group was created to obtain a mean score for module-assisted learning. The study looked at the comparison of mean scores for the pre-post test after the use of the JBS module among Year 5 students. This study also involved 5 phases as contained in the ADDIE model, namely the needs analysis phase, the design phase, the construction phase, the implementation phase, and the evaluation phase. To achieve the objective, the following hypothesis was taken.

H01 There is no significant difference in the mean score of the students' higher-order thinking skills in the post-test-based module group and traditional method group.

H02 There is no significant difference in the mean score of the student's higher order thinking skills in the pre-test and post-test for the experimental group.

3. FINDINGS

Before starting to answer the study's questions and hypotheses, it was confirmed that the groups were equal in terms of their possession of higher-order thinking skills, by using a t-test to compare the mean scores of the students in the two groups. The results in Table 2 shows that there were no statistically significant differences in the means of higher-order thinking skills. This shows that there is an equivalence between the two groups in having higher-order thinking skills.

Table 2. HOTS of Students before treatment (Pre-test)

Group	N	Mean	df	t	p
Experimental	33	17.03	64	-1.580	.119
Control	33	20.18			

H01 There is no significant difference in the mean score of the students' higher-order thinking skills in the post test-based module group and traditional method group.

To answer the question, what is the effectiveness of using a module JBS in developing higher-order thinking skills among science students? The significance of the differences between the mean scores of students in the control and experimental groups in the post-test to measure higher-order thinking skills was investigated. The results were monitored in Table 3.

Table 3. HOTS of Students after treatment (Post-test)

Group	N	Mean	df	t	p
Experimental	33	78	64	6.171	.000
Control	33	64.9			

An independent-samples t-test was employed to test the difference in higher-order thinking skills scores between experimental and control groups. As depicted in Table 3, there were significant mean differences, t= 6.171, p = .000. Mean higher-order thinking skills score for the experimental group (M = 78, SD = 8) was significantly higher than the mean for the control group (M = 64.9, SD = 9.194). From this, it is evident that there is the effectiveness of using the model in raising the level of higher-order thinking skills of the students in the experimental group.

To know the degree of this effectiveness, the size of the effect of employing the module on developing higher-order thinking skills was calculated, by calculating Eta- Square (η2). The effect size(η2) was .161, indicating a substantially large effect. The results support the conclusion that higher-order thinking skills scores between the two student groups were significantly different.

H02 There is no significant difference in the mean score of the students' high thinking in the pre-test and post-test for the experimental group.

A paired-sample t-test was conducted to test whether JBS module can improve students' higher thinking. Data were collected both before and after the JBS module among the participants. The results (Table 4) indicated that the mean post-test score (M = 78, SD = 8.00) was significantly higher than the mean pre-test scores (M = 17.3, SD = 8.09), t (9) = 46.58, p < .001. The effect size(η2) was .744, indicating a substantially large effect. The results support the conclusion that the JBS module was effective to improve students' higher thinking on science.

Table 4. HOTS of Students before (Pre-test) and after JBS module (Post-test*)*

Group	Mean	SD	t	p
HOTS				
Pre-test	17.3	8	46.58	.000
Pos-test	78	8.09		

4. DISCUSSION

As was said before, one of the primary motivations was to spread awareness of HOTS by encouraging the development of problem-solving abilities through the medium of edutainment. Students in the treatment group performed better on the post-test than those in the control group, but the results were otherwise inconclusive. This finding suggested that the utilization of the HOTS-based module was not the main factor in the enhancement of problem-solving abilities. The involvement of parents, the academic offerings of the institution attended, and individual initiative is just a few examples of the myriad variables that could affect the findings. Certainly, more research into these matters is necessary. Treatment and control groups did not perform similarly on the post-test with respect to problem-solving abilities. In order to tackle this issue, an edutainment module built on the HOTS framework can be used to help students learn to solve problems. This result agrees with the findings of Syder (2000), who found that students in the treatment group outperformed the control group in their ability to solve complicated problems. The right assignments are included in each HOTS-based lesson, allowing students to apply their newfound knowledge in the novel or real-world contexts.

On the other hand, students were able to collaborate on solutions to difficult problems and share their ideas thanks to an edutainment-based HOTS-based module. An earlier study (Chu, Hwang, Tsai, & Chen, 2009) found similar results, concluding that students' problem-solving abilities were unintentionally enhanced by collaborative learning. For educators interested in introducing new approaches to the classroom, this study is a valuable resource. Better strategies for education can be developed using a HOTS-based module that incorporates edutainment. With the help of the HOTS-based program, even the most inexperienced pupils can become proficient in the scientific discipline. Learning occurred when both the novice and the expert students were engaged in the activity and committed to completing the tasks at hand. Cognitive apprenticeship, as defined by Collin et al. (1989), is "learning through guided experience on cognitive and metacognitive," with less emphasis on physical, skills, and processes.

References

Abdelhamid, A., Shair, E., Shayib, W., & Algool, R. (2017). The effectiveness of electronic edutainment in developing English listening skills for blind students in the basic education stage.

Abu Hilal, F. (2017). The impact of entertainment-based learning on developing thinking skills in mathematics among third graders and their attitude towards it in Gaza. Unpublished master's thesis. Islamic University. Gaza.

Aksakal, N. (2014). Theoretical view to the approach of the edutainment. *5th World Conference on Learning, Teaching and Educational Leadership, WCLTA. Social and Behavioral Sciences*, 186. doi: 10.1016/j.sbspro.2015.04.081.

Azmiza Ahmad, Saemah Rahman & Ruslin Amir. (2014). Keberkesanan Modul IDEA-i terhadap kemahiran daya tindak dan kemenjadian murid. *Proceeding of the Social Sciences Research*, 685–689.

Chua Yan Piaw. (2006). Buku 1: Kaedah dan penyelidikan. Shah Alam: McGraw Hill Sdn. Bhd.

Chua Yan Piaw. (2006). Buku 2: Asas statistik penyelidikan. Shah Alam: McGraw Hill Sdn. Bhd.

Chua Yan Piaw. (2006). Buku 3: Analisis data skala ordinal dan skala nominal. Shah Alam: McGraw Hill Sdn. Bhd.

Chu, H. C., Hwang, G. J., Tsai, C. C., & Chen, N. S. (2009). An innovative approach for promoting information exchanges and sharing in a web 2.0-based learning environment. *Interactive Learning Environments*, 17(4), 311-323.

Collins, A., Brown, J.S. & Newman, S. E. (1989). Cognitive apprenticeship: Teaching the craft of reading, writing, and mathematics. In L. B. Resnick (Ed.), Knowing, learning, and instruction: Essays in honor of Robert Glaser (453-494). Hillsdale, NJ: Erlbaum.

Bulunuz, M. (2015). The role of playful science in developing positive attitudes toward teaching science in a science teacher preparation program. *Eurasian Journal of Educational Research*, 58, 67-88. http://dx.doi.org/10.14689/ejer.2014.58.2

Fensham, P. J., & Bellocchi, A. (2013). Higher order thinking in chemistry curriculum and its assessment. *Thinking Skills and Creativity*, 10(1): 250–264. http://doi.org/10.1016/j.tsc.2013.06.003

Gough, A. (2014). STEM policy and science education: Scientistic curriculum and sociopolitical silences. *Cultural Studies of Science Education*, 10(2): 445–458. http://doi.org/10.1007/s11422-014-9590-3

Haahr, J. H. (2005). Explaining Student Performance: Evidence from the international PISA, TIMSS and PIRLS surveys. Final Report. Danish Technological Institut.

Jones, P., Demetriou, S., Bogacz, R., Yoo, J., & Leonards, U. (2011). Toward a science of learning games. *Mind, Brain and Education*, 5(1), 33–41. doi:10.1111/j.1751-228x.2011. 01108.x

Kurniawati, H. A., Erriska, R. R., & Prasetyo, Z. K. (2020). Development of POE and SETS based science e-module to facilitate creative thinking skill and collaboration skill. 401(Iceri 2019), 122–126. https://doi.org/10.2991/assehr.k.200204.022

Kusmarni, Y. (2017). The development of edutainment learning model in social science education/IPS Research and development study on IPS education at elementary level in Bandung and Cimahi.

Mohd Hasril Amiruddin. (2014). Keberkesanan modul asas keusahawanan bercirikan strategi pembelajaran masteri terhadap pelajar orang asli. Tesis Ijazah Doktor Falsafah. Fakulti Pendidikan Universiti Kebangsaan Malaysia.

Nasr, R. (2019). The use of edutainment in science teaching to develop achievement and academic integration among primary stage students. *The Egyptian Society for Practical Education*, 22(6).

Nixon, R. D., & Rackebrandt, J. (2016). Cognitive load undermines thought suppression in acute stress disorder. *Behavior Therapy*, 47(3), 388-403.

Nor Aizal Akmal Rohaizad. (2015). Keberkesanan modul pengajaran dan pembelajaran dalam perkembangan kecerdasan emosi murid-murid prasekolah. Tesis Ijazah Doktor Falsafah (Psikologi Pendidikan). Fakulti Pendidikan Universiti Teknologi Malaysia.

Okan, Z. (2003). Edutainment: Is learning at risk? *British Journal of Educational Technology*, 4(3) https://doi.org/10.1111/1467-8535.00325.

Rahman, N.A., Kasinathan, V., Logeswaran, R., & Taharim, N.F. (2017). Edutainment for effective teaching and learning of digital natives.

Ritz, J. M., & Fan, S. C. (2014). STEM and technology education: international state-of-the-art. *International Journal of Technology and Design Education*, 25(4): 429–451. http://doi.org/10.1007/s10798-014-9290-z

Saripah Salbiah Syed Abdul Azziz, Asmahani Ahmad Suhairun, Salihan Siais, Othman Talib, Nor Zuhaidah Mohamed Zain, Tengku Putri Norisah Tengku Shariman, Nor'ain Mohd. Tajudin, Nurul Aini Bakar, and Kamaruzaman Jusoff. (2013). Keberkesanan modul multimedia kimia organik: Mekanisme tindak balas SN1 dan SN2. *Asia Pasific Journal of Educators and Education*, 28, 56-68.

Suma, K., Sadia, I. W., & Pujani, N. M. (2019, October). Effect of physics module based on activity and conceptual change text on students' conception of static electricity. *In Journal of Physics: Conference Series*, 1321 (3), 032072. IOP Publishing.

Snyder, K. (2000). Asynchronous learning networks and cognitive apprenticeship: A model for teaching complex problem-solving skills in corporate environments. (Doctoral dissertation). New York University, New York.