Genius Learning Strategy of Basic Programming in an Adventure Game

E Junaeti*, H Sutarno, and R R Nurmalasari
Department of Computer Science Education, Universitas Pendidikan Indonesia
*enjun@upi.edu

Abstract. Basic programming is fundamental knowledge that are essential to be learned, so that needed a learning strategy for creates conducive learning atmosphere in order to maximize the outcome, one of them is genius learning strategy. However, using the same learning strategies do not necessarily produce the same outcome, because it is influenced by many things, such as the delivery of teacher and student character. To reduce differences in methods of delivery by the teacher then needed a media that can convey the material without being influenced by the character of the teacher. The purpose of this study was to observe the influence of media, genius learning strategy of basic programming in an adventure game, to student cognitive abilities. Media was constructed in an adventure game form used genius learning strategy process. Furthermore, the eligible media was used to teach in a classroom to see its effect on the cognitive abilities of students by comparing them with other class that learning used same strategy without the media. Based on result obtained, there was a difference between learning outcome of classroom learning with media and without media. To summarize there is correlation of using this media and cognitive abilities of students.

1. Introduction
Based on James reaseach in [1], teachers must ensure that their classes as conducive as possible to transfer their knowledge to students. The compatibility between students learning style and teaching methods can make the class more conducive, so the used teaching methods must serve variety learning style needs [2]. However, Ayeni and Olasunkanmi [3] stated teachers’ attitude with their methods of teaching related with the students’ learning outcome, although the relationship was no significant. Hence using the same learning strategies do not guarantee to produce the same outcome, because it is influenced by many things, included the way of material teaching delivery by a teacher. To reduce differences in methods of delivery by the teacher then needed a tool that can convey the material without being influenced by the character of the teacher.

Lameras et al [4] identified 165 papers that reported conceptual and empirical evidence on how learning attributes and game mechanics may be planned, designed and implemented by university teachers interested in using games, which are integrated into lesson plans and orchestrated as part of a learning sequence at any scale. In line with their result, Martí- Parreño et al showed games used in education as a promising tool to motivate and engage students in their learning process, because they facilitate scaffolded instruction based on each individual student's needs [5].

Based on the reasoning, this research would like to construct a learning media in an adventure games form. The media would be integrated into lesson plan and the steps would be presented following the learning process used the Genius Learning Strategy. Genius Learning Strategy was a
learning model developed by Gunawan [6] to create positive and conducive learning atmosphere. Furthermore, the eligible media was used to teach in a classroom to see its effect on the cognitive abilities of students by comparing them with other class that learning used same strategy without the media. LORI instrument was used as a tool to examined the eligibility of media. Based on result obtained, there was a difference between learning outcome of classroom learning with media and without media. To summarize there is correlation of using this media and cognitive abilities of students.

2. Genius learning strategy
The basis of genius learning is the theory of constructive learning according to Piaget [6]. The theory of constructivist learning emphasizes how students build their own knowledge and the theory is more concerned with the learning process. From this constructivist learning theory was born accelerated learning or accelerated learning later by Bobbi De Porter developed into a quantum teaching model [7]. From here genius learning was born into a learning model based on quantum teaching but has considered the conditions in Indonesia. Other names often used include Accelerated Learning, Quantum Teaching, Super Learning Efficient and Effective Learning. In essence, the purpose of various models is the same that is how to make the learning process to be effective, efficient and fun.

The Genius Learning Strategy steps are described in Figure 1.

![Figure 1. Genius Learning Strategy Steps.](image)

Based on the Figure 1, Teachers are responsible to create conducive learning environment, then they must connect what will be learned with what has been known and what benefits will be obtained from the information. The next step is the teachers should give a big picture of the whole material and determine the learning purposes and the indicators of achievement. Then the teachers give the material and the students integrate what they learn and discover the true meaning of what has been learned. The last, the student is given a test to discover the achievement of student learning results by the teachers. In addition, the teacher reviews and concludes the learning outcomes.

3. Game scenario
Based on observation which was conducted by the researcher in several vocational school in Bandung and Cimahi obtained that the most difficult course was Basic Programming, especially the material about Array. Therefore the researcher made “Array Adventure” which is an adventure game of Basic Programming specially in array learning adopted stage learning of Genius Learning Strategy as game scenario.

There are two levels of the game categorized by material content. The first level is a game about one-dimensional array, while the second level is a game about multi-dimensional array. If the player does not successfully complete the first level, the second level will not open. Generally, learning scenario design on Array Adventure game for each level are presented in Figure 2.
Based on Figure 2, each level start with students view apperception then they write initial knowledge as connecting stage. In stage of generalization, students will view mapping map of content material followed by view of learning purposes. Then to get a key of content materials students must finish some mission (Information Loaded). After students get all of content materials students will summarize the content material (activation) and finish a test (demonstration). As a regrapple students will summarize content materials which had been learned and understood. The last students will answers some questions as a quiz. Figure 3 present some interface of the game stages. Figure 3 shows Interfaces of the games which colours, backgrounds and characters selection had been adapted to the characters of the vocational students.
Based on the design process, games consist of two types of serious games and entertainment games [8], which serious games have “serious” and “game” dimensions, but entertainment games featuring only “game” dimensions. Based on the classification of a game, this games is a part of Serious Games related to the structure of a serious games as we call it “Gameplay” aspect.

4. Results and discussion
The experiments of developed game were executed by involving 30 students and two experts in the field of network and the development of learning support technology. The instrument used in multimedia retrieval refers to the Learning Object Review Instrument (LORI) version 1.5 [9]. Based on the results of expert assessment, which includes aspects of media and content, the developed game are considered appropriate to apply and to be used as learning reference with overall average percentages of score are 86.25% and 93.75%. The details of the media assessment results are presented in Table 1 and Table 2.

| Table 1. Array Adventure (Media) Learning Object Review |
|----------------|----------------|
| Aspect         | Percentages of Score |
| Presentation Design       | 85               |
| Interaction Usability     | 90               |
| Accessibility            | 90               |
| Reusability              | 80               |
| Standard Compliance      | 86.3             |
| **Average**             | **86.25**        |

| Table 2. Array Adventure (Content) Learning Object Review |
|----------------|----------------|
| Aspect         | Percentages of Score |
| Content Quality| 85               |
| Learning Goal Alignment | 90               |
| Feedback and Adaptation  | 100              |
| Motivation     | 100              |
| **Average**    | **93.75**        |

Cognitively, analysis of improvement of students skill was done by gain index data offered by Hake in the measurement of enhancement capabilities [10]. The average analysis of the gain index of 0.64. Assessment of respondents to media was done through a questionnaire. Based on the result of questionnaire of student response, overall got percentage of value equal to 82.18% including in "Very Good" category.

5. Conclusion
Based on the research could be concluded multimedia learning in the form of adventure game with Genius Learning Strategy model developed was feasible to be implemented in the learning process and had an influence toward the student’s cognitive abilities.

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