

A THEORETICAL FRAMEWORK FOR RELATIONSHIP BETWEEN GRAPHIC APPEARANCE AND STUDENTS' EXPERIENCES

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Abstract-This paper considering the effect of visual design on students' learning experiences. In determining a particular visual design principles of educational games, its require a further analysis within the students' motivation, engagement and enjoyment. A theoretical framework is proposed in understanding the students' experience outcomes by placing three different graphic styles (abstract, stylized and realistic) based on the Experience Based Design Graphic Style (EBDGS) technique. In this paper, theoretical framework was closely relating to graphic styles assessment, students' preferences based on demografic factors (gender, type of schools and area) and the resulting experiences in the gaming environment. Furthermore, the reliability of the Experience Based Design Graphic Style (EBDGS) instrument and validity of each graphic style is tested through the Student Experience in Graphic Measurement Scale (SEIGMS). This framework provide a basic understanding and suggestions for the graphic style aspects with relevant experience outcomes that contributes for the game designers and educators to construct an educational games that meet the Malaysian students' needs.

Keywords: Educational Games, Graphic Styles, Students' Experiences

I. INTRODUCTION

Visual design is an information, that intended to give a presentation and more memorable understanding to the students [43]. Visual designs are capable of delivering a proper information quickly through visual form [21] based on the psychological contexts and affect the individuals' attitude and participation. Visual design is an integral component in educational games as a stimulus for attracting the students' interest and involvement towards learning content that's delivered [14]. This indicates conducive visual appearances in educational games promote student attention and experiences. The study carried out on the visual design shows a relationship between visual design with the experiences, particularly in terms of motivation, engagement and enjoyment [44]. As a result, visual design important to identify the criteria to shape usability of educational game in accordance with the structure of the individual students' affective response. With that, the design should be constituted with a better visual to enable students to prescribe, sustain and generate personal experiences, onwards increasing continuous in the learning process [22]. Appropriateness visual design presentations with students' preferences will have an impact on student fulfillment. Accordingly, experiences can serve as an important indicator of the degree contentment design presentation educational games. The experience outcomes acquired, as assessment of efficiency educational games towards the ways of appearances. Hence, understanding the current visual design factors and the impact on educational game appearances, eventually affect the overall student experiences.

II. RESEARCH PROBLEM CONTEXTS

Many local studies have been conducted to distinguish the learning abilities of educational games to help increase student achievement in several views aspects such as demographic factors [35], pedagogy and learning content [33] and teachers' attitude [24]. The results of previous local studies only centered on the factors influencing the utilization of educational games in schools, but less emphasize research on the extent of design in educational game development in terms of visual design. Critically review the literature pertaining to the importance of visual design in a game could be referred to among researches that have been carried out by [26], [2], [9], [18] and [42]. In these studies found that visual design aspect that contributes annotations player experiences. Yet, studies conducted are still less shows the relationship between the student experiences and educational games with visual design. Educational games become unproductive and tedious due to the low grade of visual design presented and suggested that more attentiveness should given to the suitability of visual design could meet the tastes of students [15]. Lack of student interest in the activities implemented in educational games, or underestimate the educational game because students were not receiving the presentations [38]. The preliminary investigation indicates less point up the development and evaluation educational games, especially in the visual design aspect for local Form One students in Secondary Schools.

Thus, efficiency educational games usage is held up by the implementation of suitability visual design to enhance student experiences [44]. Additionally, lack of exposure an organized graphic style technique in educational games led to the resulting students will less attracted [14]; [26]. Based on the problems as mentioned above, it is clear there is a need to conduct research to review the importance of the relationship

between visual design and student experiences. In addition, identify the suitability of graphic style in educational games linked to the student experience providing support and aid to fittings the formation gaming that attains students' perception. A well blended design is needed in an educational game to engage our Malaysian students' experiences and learning process.

III. RELATED THEORIES

i) Motivation Theory

Motivation elements important to attract students and ensure they pay attention in class [19]. This also shows motivation theory impact on the instruction development and closely linked to maintaining the students' interest in teaching and learning process. As indicated by Keller "motivational tactics have to support instructional goals". Thus, Keller was founded four main elements in the learning process that can motivate students or known as ARCS model. The four elements that built the ARCS model stand out Attention, Relevance, Confidence and *Satisfaction* Growing students interest in an instructional tool, in relation to understanding student experiences and instruction design.

ii) Self-Determination Theory

The advances of motivation may restructure an importance experiences impact in educational games. From students' experiences, there is an urgent need to understand the relationship interplay between cognition, motivation and feelings in a process of learning through educational games. In this, the Self-Determination Theory (SDT) becomes the foundation for researchers to acquire, analyze and evaluate the players' experience in games [5]. As a supporter of motivation, Self-Determination Theory implicated three basic psychological needs (competence, autonomy and relatedness) are itemized to identify motivation value in a digital game [41]. The three basic needs included in the Self-Determination Theory ability to presume motivation, engagement and enjoyment outcomes [31]. Understanding into Self-Determination Theory able to practice measuring the amount of experiences that take place in educational games. The purpose of Self-Determination Theory in experience processing that permit the appraisal of the experiences significant through both game design features and players personal complacency.

iii) Visual Attention

Visual attention actively sustained concentration to a certain number based on the visual object influence the ongoing action and cognition [12]. For an enhance a person's ability to recognize certain visual concepts in learning and instruction, visual perception process and experience are intimately related [37]. As added by Chun and his coauthor visual attention is

an active maintenance of visual processing towards visual items to enhanced ongoing experience. Accordingly, visual attention emphasized knowing individual's experience through the selection of visual features that should attend in learning activities that can clarify the efficiency of visual to delivering knowledge. This also indicates the importance of visualization in a game to attract the concentration of the target audience.

iv) Gestalt theory

Gestalt theory describes the significance of visual elements in an object to increase the individual's reception and tendency to attract a person's attention in a certain visual presentation [20]. This theory function as the suggestion aspect and practicing various visual elements (shape, form and composition) should be presented to achieve efficient visual image results [11]. Thus, The concept of applying the gestalt principles to assist the visual presentation in games has been suggested by [10]. As such, understanding the gestalt principles of producing a visual image and applied in game design crucial to encourage players' involvement.

v) McCloud Theory

McCloud presents a basic theory of icon (a visually image resembling the real object of several aspects). According to McCloud, a continuum from realistic to cartoon images showed increased levels of abstraction iconic [25]. These changes simplify the image of visibility. In addition, McCloud theory distinguishes identification image into three main categories: abstraction, cartoony, and realistic. Thus, understanding the concept of imagery increasing, convenience construct the visual appearances in an educational game.

IV. GRAPHIC STYLES

The word 'style' in the field of visual art related to the composition and the relationship between the form an overall image, that based on the principle elements, techniques, expression and inspiration [16]. The visual style is an implementation technique that carried out by artists to portray the mood and features to be conveyed on the audiences [30]. In game, graphic is more delineate on surrounding representations and components or objects that are placed in the game environment to enhance gameplay. The styles of art have ranged from abstract to realistic [17]. Typically, the graphic styles are categorized into three different types: i) abstract, ii) stylized and iii) realistic. Each graphic style has been summarized as accordance with the form, surface and detailed [26]:

Abstract

- Symbolic forms.

- Reducing the formal quality
- Low in the level of detail
- Flat Shadings

Stylized

- Identifiable forms (unrealistic proportions or juxtapositions of parts)
- Quality is expressive
- The level of detail can be composed from the lower to higher
- Shading of curved surfaces or have a texture

Realistic

- Presentation style in photo-realistic modeling accurately the familiar objects.
- Level of detail is high.
- Realistic shadow casting, Light movement

V. STUDENT EXPERIENCES

Experience as important aspects that is respected for the ability, suitability and efficiency of educational games in teaching and student's involvement. This is due, the experience result gained through the relation between students' reaction and educational games. With that, the experience seen as a complement to induce a person to learn through the software application. In this regard, student experience need be reviewed in terms of motivation, engagement and enjoyment in an exertion to enhance the efficiency of educational games. As the result, examining the influence of visual design towards students' experiences, hoped able to understand and sets aside the development of game-based learning design in instruction to get better.

i) Motivation

Motivation defined as a process of activating, maintaining and directing behavior towards a certain goal [28]. Motivation involves interest, value of organizing the experiences in learning [40]. Motivation divided into Intrinsic motivation and Extrinsic motivation. Intrinsic motivation categorized as free choice, interests and personal needs [13]. Extrinsic motivation refers to external motivating resources to encourage individuals to conduct certain activities [32] such as grade marks [7]. In games, motivation playing a important function in gaming experiences [7]. Motivation able pushed the players becoming more engagement and involved with games and turn the games be more successful [36]. With this regard, the relationship between students' experiences with game more domain considering intrinsic motivation to analyze the motivating factors [27]. In particular, the potential usage of educational games need be viewed especially on student experiences in terms of intrinsic motivation.

ii) Engagement

Engagement is a connector between the emotional, behavioral and cognitive emerged between persons

and resources [3]. Engagement as the player's degree of involvement in a digital games to attract players continuous play [8]. The increasing of engagement experience relies on the educational game design, particularly game features to preserve the degree of interests [34]. Thus, engagement is one of the most frequently cited and needed to consider in digital game for enhancing the student experiences [6].

iii) Enjoyment

Enjoyment is in respect of individual's perception of pleasant feeling when conducting an activities [4]. As such, enjoyment regarded as an important source of experience in student learning [23]. Further, enjoyment important as system experience in software application [29]. Generally, enjoyably viewed as an experience strictly related to motivation and the factors in facilitating the engagement [1]. Resulting enjoyment experience interlink relationship between motivation and engagement, the enjoyable aspects also need take into consideration in determining the suitability of educational game appearances.

VI. THEORITICAL FRAMEWORK OVERVIEW

In this research, the theoretical framework was developed with adaption of Activity Theory (AT) that conducted by Engestrom in 1993. The Activity Theory review the contexts between human (subject) and their reacts upon (object) on a tool that concerned an individual responds based on the tools that occur during the reception process of information [39]. Thus, this theory assumes the student experience built through their actions in the wider contexts that situated in gaming activities [45] especially in visual design contexts. With regard to this theory, the subject replaced with students, the object is replaced with the experiences and the tool replaced with graphic styles. The Activity Theory system for describing the relationship between graphic styles and students are depicted in Figure 1.

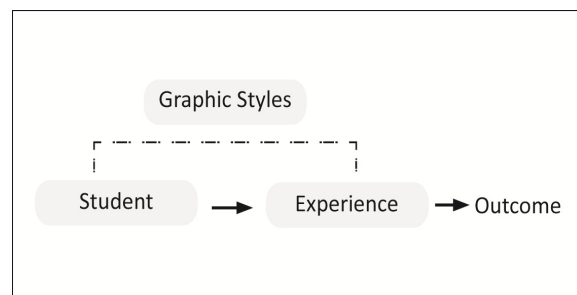


Figure 1: Structure of Activity Theory

The research framework as shown in Figure 2., explained an overview structured research conducted. The research framework was introduced into macro and micro level. In accordance with principles of activity theory. The macro level tries to indicate the relationship to achieving differences of student experiences and suitability graphic style have

employed to form a better student experience. Accordingly, determine and distinguish between the experiences of student groups have consideration on demographic factors.

Based on the theoretical framework presented, the variables were divided into three main sections: graphic style, experience outcomes and demographic factors. Graphic style related to the ways of visually appearances in educational game environment. Each graphic style that will be applied as independent variables in this research. The experiences results were related quantity of connection between individual in the appearances style gaming environment. As such, the independent variables were used to measure the dependent variables of motivation, and enjoyment. The level of students' experiences also influenced by demographic factors. Hence, area, gender and type of school were selected as moderator variables.

Micro level is more aims on the prototypes development (EBDGS) that need to be compiled with learning content, syllabus, game design, game goals and visual design features (graphic style). With that, the micro level involve the game development process based on Model Iterative. Experience Based Designing Graphic Style (EBDGS) was built upon identifying the appropriate requirements and challenges of implementing graphic styles in educational games that meet the student preferences. Eventually, Experience Based Designing Graphic Style (EBDGS) will be evaluated using Student Experience in Graphic Measurement Scale (SEIGMS) questionnaire to determine the consideration of graphic style quality in designing games for learning through student motivation, engagement and enjoyment. The results represent the summarization guideline to portray the structure of the development as a new approach to greater improvement enhance Malaysian student involvements.

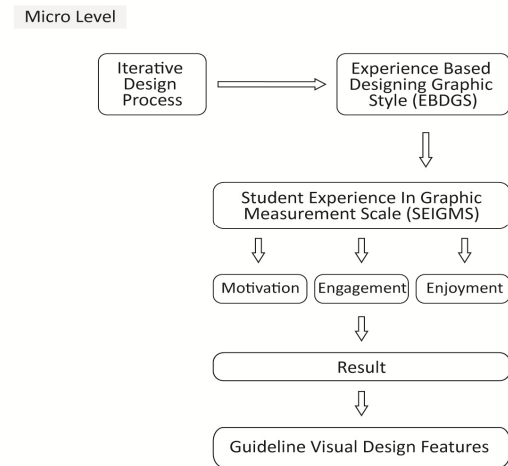


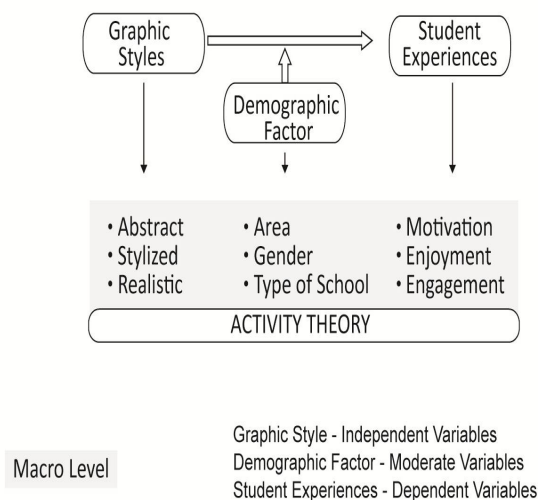
Figure 2: Theoretical Research Framework

CONCLUSION

Educational games can profit from visual design features in a different graphic styles extent, as a substance to attract the student interest intrinsically linked to student experiences that enhance from visual design improvement. With that, the assessment of suitability visual design in educational games not only provide valuable information to measure student experiences, and also provide guideline to designers and educators in offering an efficient learning presentation and organize a strategic plan enhancing the educational game appearances. In addition, studies on the visual design of educational games in Malaysia still in early stage [33]. Hence, this study conducted to identify students' perceptions towards educational game design and the students' experiences outcomes on graphic styles in educational games. This research hopes will identify visual design trends with several graphic styles that should embedded in educational games, as an external factors that may have influences on student experiences.

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