Andragogy and Gamification among Undergraduate Students

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Abstract: Undergraduate students who are enrolled in research methodology courses tend to believe that such courses are overwhelming and that it is almost impossible to get through them. It has been reported that undergraduate students, in particular, enter research methodology courses with feelings of stress and anxiety, although in most cases, they are not really aware of what research methods are all about [4,15]. The aim of this study is to identify the level of attitude towards research (ATR) that undergraduate students experience and the use of gaming elements to assist students to deal with it. This paper considers the impact of gamification in creating innovative learning environments for higher education to improve students’ attitude towards research methodology course. The sample of the study consisted of 110 students who had completed a research methods course. Based on the findings, five factors of student attitudes in ATR scale towards research (research usefulness in profession, research anxiety, positive attitude towards research, relevance to life and research difficulty) show a good improvement. However, this study is measured with descriptive study and can serve only as an exploratory point of departure for further studies. Students views, conceptions and attitudes towards research methods should be further investigated using other data sources as well (e.g. interviews) to obtain a richer understanding.

1. Introduction

Undergraduate students need to take course in research methodology as part of their education program. Students usually tend to view research methods courses negatively because they suddenly find themselves being introduced to completely new concepts that are often accompanied by statistically based ideas. Being confronted with new and challenging material is likely to trigger a number of responses from these students including stress, uncertainty and anxiety. Indeed, recent research on quantitative research methodology and statistics courses shows that college students have difficulties and experience anxiety [1,2,5,4,10]. An understanding of these attitudes is necessary to help lecturers facilitate the learning of research for their students, by enabling them to create more positive attitudes toward such courses. With continual assessment, lecturers are faced with the question: how can we actively engage each learner in a way that encourages self-direction while developing the ability to independently solve problems? The unique learning characteristics of adult learners must each be considered in the design of learning experiences in higher education environments.

2. Literature Review

Andragogy has contributed to the field of adult education since the 1970’s when it became officially defined by Malcolm Knowles. The early framing of andragogical studies have progressed as the field of andragogy continued to develop, but have remained learner focused and differentiated from pedagogical studies. The implementation of andragogy in adult learning settings has provided the field with clearer understandings of how assessment of adult learners may best be conducted, and how self-directed learning influences the practice. Malcolm Alexander provided the model now recognized as andragogy, based on six assumptions; the need to know, the learner’s self-concept, the role of the experience, readiness to learn, orientation to learning, and motivation [11]. Andragogy assumes that learners are self-directed. Adult learners want and need to feel that they are in control of their education. “An educational system that does not nurture this need for autonomy and self-direction is likely to produce adults who assume the role of passive dependent and passive learners” [11], which is not the population this world needs. The role of experience is the previous experiences and knowledge that adult learners possess. Adult learners bring with them “a greater volume and higher quality of experience than younger children” [11]. Good andragogical practices employ previous experience into educational models. The orientation of learning in andragogy is “problem-centered, task-centered, or life-centered” [11]; it relates directly to the reason why adults are seeking additional education, they have a problem, a
task, or life scenario they would like to change, and have acknowledged furthering their education is the way to do that. Hence, andragogy is also centered on those situations. Adults seek additional education for many reasons; andragogical methods have been shown to be the best way to teach them [12]. Although this goal forms the basis for delivery in most courses taught, but the importance of research methodology course is more important since it apply to not only to undergraduate students but also postgraduate student. Undergraduate students find themselves being introduced to completely new concepts that are often accompanied by mathematically-based ideas. Being confronted with new and challenging material is likely to trigger a number of responses from these students including stress, uncertainty and anxiety. Indeed, recent research on quantitative research methodology and statistics courses shows that college students have difficulties and experience anxiety [1,2,5,4,10]. Despite this situation, this paper discuss that changes should be made on how to teach students, moving away from typical teaching method in class and instead relying more heavily on formative approaches that are concerned with Assessment for Learning. Specifically, these formative assessments for learning should be used to gamify the learning experience for students.

3. Problem Statement

It has been reported that students enter research methodology courses with feelings of stress and anxiety, although in most cases, they are not really aware of what research methods are all about [4,15]. Students tend to believe that courses are overwhelming and that it is almost impossible to get through them. In addition, many students are not even sure why they have to complete such courses and what their usefulness will actually be in their teaching careers [3,13]. Such attitudes towards research create concerns among teacher educators since it has been found that anxiety affects learning negatively [9]. This is also alarming because these attitudes may prevent students from being able to read critically or appreciate research results in their professional careers. Although this claim needs to be substantiated by research, it has been already highlighted by [7] who found that education professionals who had completed a research methodology course and experienced difficulties and anxiety, were not motivated to engage in research of their own or take additional research courses. In higher education settings, lecturers are faced with the same dilemma each session: how best to deliver course materials in a way that will actively engage learners, allow for self-direction and develop learners’ abilities to independently solve problems – all while building learners’ knowledge of the subject content and meeting the course objectives. This raises many and varied challenges for lecturers. Given the diversity of issues that must be considered, and the domain-specific nature of some of these considerations, this paper will specifically focus on the unique needs of adult learners in university. Practical suggestions for addressing adult learners’ needs via constructivist theories of learning will be provided through examples employing gamification. Constructivist theories of learning are concerned with active enquiry, guiding learners and coaching within a learning context that is situated by authentic activities [12]. This approach has potential to increase learning outcomes and enrich learning experiences. It also allows learners to develop skills in dealing with complex open-ended problems while maintaining a high level of interest in their targeted learning content. Research Methodology course in University Teknologi MARA (UiTM) is to introduce students to a systematic inquiry process aimed at providing information to solve financial problems. It involves problem identification, information gathering, data analyzing, determining factors associated with the problem and suggesting corrective measures. Students should be able to understand research and the difference between quantitative and qualitative research method, understand a systematic research process including identifying broad problem area, defining problem statement, compiling literature review and developing research framework, develop research design, collect and analyze data and interpret the data and write a research report for different types of research methods. The research questions that will be examined in this study are the following:

What is the level of attitude towards research (research usefulness in profession, research anxiety, positive attitude towards research, relevance to life and research difficulty) experienced by undergraduate students enrolled in a research methodology course before and after applying gamification?

4. Research methodology

Sample

The target population for this study was students who had attended their course in ‘Research Methodology’ course for 3 months in Faculty of Business and Management, University Technology MARA (UiTM), Melaka. This population would have consisted of about 200 students. Of the total 92 students in the sample, 23.9% were male and the remaining 76.1% were female. Although there were a disproportionate number of females in the study, this was because there are generally more female than male students that study in UiTM, Melaka.
students who had attended the classes from which the data were collected, responded to the questionnaire, and no non-responses were encountered. A descriptive study was conducted to identify the level of attitude towards research methodology courses in class. Students were asked to answer the questionnaire before and after they play and experience the game. The game was created as an interactive of the classic board game. Students will enjoy as they roll dice and move up the board in a race against their opponent. As they move up the numbered grids they have to answer number of questions related in research methodology and thus improve their research skills. Students enjoy hours of endless fun with this engaging game and will sharpen their mind. The game consists of gaming elements such as; the game can be understood from the perspective of a system. A game is the interplay of a group of predefined elements of interaction [14]. This engagement is linked to Malone and Lepper's Taxonomy of Intrinsic Motivations' under the category of interpersonal motivations as: cooperation, competition and recognition [6].

Instruments

Questionnaires of Attitudes Toward Research (ATR) scale [12] were administered to the students for the purpose of this study. The Attitudes Toward Research (ATR) scale consists of 32 items measured on a 7-point Likert scale. A value of 1 indicates a response of ‘strongly disagree’, while a value of 7 corresponds to ‘strongly agree’. The items in the ATR can be subdivided into five subscales: usefulness of research in the students’ profession; research anxiety; positive attitudes towards research; relevance of research in the students’ personal lives; and research difficulty. The research usefulness subscale included questions such as ‘research is useful for my career’ and ‘research is connected to my field of study’. The second subscale, that of research anxiety, included questions such as ‘research makes me nervous’ and ‘research is stressful’. The third subscale, that of positive attitudes toward research, included questions such as ‘I love research’ and ‘I enjoy research’. The fourth subscale, that of relevance to life, included questions such as ‘I use research in my daily life’ and ‘Research oriented thinking plays an important role in everyday life’. Finally, the last subscale, that of research difficulty, included items such as ‘I have trouble with arithmetic’ and ‘I find it difficult to understand the concepts of research’. The Cronbach’s alpha reliability estimates of the subscales were adequate towards high. The Coefficient alpha reliability for the research usefulness in the profession factor which included 9 items was 0.88; the reliability for the research anxiety factor which included 8 items equaled 0.91; the reliability for the positive attitudes toward research factor equaled .93 (8 items). The reliability of the life relevancy factor that included 4 items equaled 0.72, while the reliability for the research difficulty factor equaled 0.70 (3 items). The reliability of the whole scale was very high.

5. Second and Following Pages

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5. Results

The results of this analysis describe the Attitude Towards Research (ATR) levels of the students, before and after playing game. The items in the ATR which are: usefulness of research in the students’ profession; research anxiety; positive attitudes towards research; relevance of research in the students’ personal lives; and research difficulty shows a different results before and after the game. In table 1, the result shows that before the students play and experience the game, most of them feel the useful of research methodology course in their profession is less but it increase after they play and experience the game. The level of research anxiety among students is decrease after they experience the game. While the positive attitude towards research is increasing after they play the game, students also realize that the relevance of study research to their life after they play the game. Research difficulty also decreases after they play the game. Overall, the students’ responses to five variables is improve after they play and experience the game on a 7-point scale.

<table>
<thead>
<tr>
<th>Variables of ATR</th>
<th>Mean</th>
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<tr>
<td>Research Usefulness in Profession</td>
<td>5.22</td>
</tr>
<tr>
<td>Research Anxiety</td>
<td>5.74</td>
</tr>
<tr>
<td>Positive Attitude Towards Research</td>
<td>4.00</td>
</tr>
<tr>
<td>Relevance To Life</td>
<td>3.85</td>
</tr>
<tr>
<td>Research Difficulty</td>
<td>4.97</td>
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6. Conclusion

Recognizing the importance of paying attention to research holistically, the results of this study suggest...
the need to pay more attention to the development of research as an integrated whole [4]. The finding of this study confirm some of the results and contributes to understanding students’ attitudes about learning research methodology and suggests possible teaching and learning strategies that could be potentially helpful in improve students’ attitudes and to assist them learn research methods effectively. This paper has identified that the application of gamification can improve student’s interest in research, more active engagement can be achieved and greater learning outcomes are therefore obtainable. In general, the findings of this study highlight the following issues. First, the results show that the students found their research courses is more useful in their profession, more positive attitude towards research and feel research courses is more relevance to life once they have experienced and enjoy the game. In other words, self-perceptions that were positively related to the research course seemed to increase after they play the game. This implies that it is extremely important to help students overcome any difficulties during the course. Future investigations should try to determine whether self-perceptions and research anxiety are causally related. Unfortunately, it is beyond the scope of this investigation to determine whether high levels of research anxiety worsen students’ self-perceptions and vice versa. It is more likely that Onwuegbuzie (2000) is right to point out that there is a bidirectional relationship between research anxiety and self-perception. A second result of this study is that anxiety level and difficulty level reduce after gamification is applied. This may be explained in that students who play the game ended up being more confident, which could in turn reduce their anxiety and difficulty levels. This is in line with a study done by Papanastasiou (2005). These findings shed more light on the impact of undergraduate student perceptions about research methods. Some of these implications are discussed below. First, some of these factors associated with attitude towards research can be tackled in the classroom. For example, it is important for instructors to be aware of students perception towards research methodology course, and make efforts to address it early on in the course. Encouragement from instructor and flexibility (Wilson & Onwuegbuzie, 2001) and humorous teaching style (Forte, 1995; Wilson, 1998) beside applying gamification were suggested in the literature for reducing statistics anxiety. Second, the structure of the course and the classroom environment should be supportive of learning. Research methodology courses may be structured in such a way as to include activities designed to target the roots of students’ ATR (e.g. the creation of support groups to work on assigned projects; the use of performance assessment strategies instead only of tests). It is important to help students understand what is being taught, and what the usefulness and importance of such a course is. Thus, for example, providing practical application, real-life stories and case examples may be helpful in reducing research anxiety (Pan & Tang, 2004; Wilson, 1998). By doing so, the students might become more patient with the course materials, and might make further efforts to comprehend what is being taught. Research methods courses must emphasize “connections to the learner’s knowledge that make the transition to new knowledge both safer and more meaningful” [17]. Limitation in this study is that students’ views on research methodology were measured with descriptive study. Students views, conceptions and attitudes towards research methods should be further investigated using other data sources as well (e.g. interviews) to obtain a richer understanding of research anxiety. At this time, this study can serve only as an exploratory point of departure for further studies. Additional investigations of the interaction of anxiety with research methods courses, and particularly the implementation of gamification, are essential. For example, replications of this study, with postgraduate students would be especially desirable. This could provide more detailed guidance to instructors of research methods courses to structure their postgraduate courses accordingly. Finally, specific intervention methods to alleviate anxiety can be designed, carried out and evaluated in the future.

7. References


