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Students' Preference on Learning Agents' Gender

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Abstract

Studies found that gender of teachers or leaning agents was one of the factors influences students' learning. This study aimed to examine learning agents' gender preferences by students in mathematics learning. During the mathematics learning with learning agents', students were exposed to male and female learning agents. The learning agents provided teaching materials and encouragements as real teachers. Questionnaire was distributed at the end of the study for collecting students' opinions on male and female learning agents in their learning process. Findings showed that preferences on both male and female learning agents' by students were almost equal.

Key words: Gender, Learning agents, Mathematics

INTRODUCTION

In a computer-based learning environment, the learning agents (LAs), also known as pedagogical agents, are used by some educators to assist students' learning. According to Heidig and Clarebout (2011), LAs are the characters that guide through multimedia learning environments and gained increasing interest nowadays. Blanchard (2010) defined a pedagogical agent as an intelligent agent that provides interactive teaching on a subject matter based on the pedagogical strategies. According to Korosec (2013), LAs are digital avatars and usually are used for monitoring students' performance. Besides that, according to Schroeder and Adesope (2012), LAs are agents that help to coach, guide, give tutorial, inspire, motivate and support students in their learning process. The LAs provided teaching materials and encouragements as real teachers.

Researchers (Ozogul, Reisslein, & Johnson, 2011; Van Vugt, Bailenson, Hoorn, & Konijn, 2010) suggested that characteristics of LAs such as gender play important roles in students' learning. Baloglu and Kocak (2006) too agreed that environmental factor such as gender gives impact on students' learning. With the believe that gender of a LA affects students' learning, Osman and Lee (2012) had created and provided to their students a young female cartoon avatar who acted as the learning companion of the students as well as inspired and motivated them in order to complete the tasks in the module. Ozogul, Johnson, Atkinson, and Reisslein (2013) found that there was no overall significant difference in the gender preferred by students, i.e. 52% of students preferred a female LA while 48% preferred a male LA. However, their findings found that most of the students preferred LAs of same gender as them, i.e. male and female students showed a significant preference toward an agent that matched their own gender. In addition, Baylor and Kim's (2004) finding showed that there were significant effects of LAs' gender on students' self-efficacy. Students who learned with female LAs were found to have higher self-efficacy compared to students who learned with male LAs. However, another study of them found unfavourable outcomes in terms of learning, self-reported self-regulation or self-reported satisfaction for agents who matched the students in gender (Baylor & Kim, 2003). Other studies found that students did not prefer a LA that matched their gender (Moreno & Flowerday, 2006; Behrend & Thompson,2011). Kim, Baylor and Shen (2007) found that male LAs helped in motivating students in their learning.

This study aimed to examine learning agents' gender preferences by students in mathematics learning particularly in reducing students' anxiety level.

Method of Research:

Sample:

The participants for this study were students from a university in Malaysia. A total of 130 undergraduate students with age range of 17-25 years old formed a sample in this study. The sample consisted of 52.30% male and 47.70% female students.

Instrument:

Two sets of online questionnaires which consisted of questions with 7 likert-scale ranged from 1 (Strongly Disagree) to 7 (Strongly Agree) were developed. The first set was to determine students' anxiety levels so that students can be grouped into 3 different anxiety levels groups, i.e. high, average and low anxiety levels. Set two consisted of 2 sections in which Section one was to collect the general information such as ages, gender, etc., and Section two was to collect the data on students' opinions about their preferences on LAs' characteristics such as gender, age, etc.

Procedure:

In the beginning of this study, students were given the online consent form to obtain their consent to participate in this study. Students were then answered an online questionnaire set 1. After the administration of online questionnaire, students started their mathematics learning with LAs in a computer-based environment. The system provided options for students, that is, students had the options to choose either male or female LA as their teacher or tutor in their learning. Either male or female LA is chosen by students, the same content of lessons and mathematics questions will be delivered by LA to students. The LAs that were designed for this study acted as real teachers who provided teaching materials and encouragements to students. Finally, at the end of the study, students were given the online questionnaire set 2. Their responses from both questionnaires were then analysed using SPSS.

Results:

This section discusses students' preferences on LAs' gender only. Figure 1 shows the frequency of students of different anxiety levels.

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It was found that majority of the students felt anxious towards mathematics before the study. Students' preferences on LAs' gender during the learning of mathematics with LAs were obtained and were displayed in Table 1.

It can be seen from Table 1 that 58 students preferred male LAs. From the sample, it was found that 9.23%, 20% and 15.38% low, average and high anxious students, respectively, preferred male LAs. Interestingly, almost the same number of students, i.e. 57, preferred female LAs. It can be seen from the table that 8.46%, 14.62% and 20.77% students of low, average and high anxiety levels, respectively, preferred female LAs. However, further analysis showed that students who had low and average anxiety levels preferred male LAs more than female LAs, while students with high anxiety level preferred female LAs more than male LAs (Figure 2). The findings recorded slightly higher number of low anxious students preferred male LAs, i.e. 1 more student preferred male LAs as compared to female LAs. For the average anxiety level, 7 more students preferred male LAs if compared to female LAs (Table 1). In contrast, high anxious students preferred female LAs (Figure 2), that is 27 students preferred female LAs while 20 students preferred male LAs (Table 1). In other words, female LAs were more favoured by the high anxious group, i.e. 7 more students preferred female LAs.

However, there were some students (15 students) did not have any preferences on LAs' gender. There were 2.31% low anxious students, 5.38% average anxious students and 3.85% high anxious students provided no opinion in their preferences (Table 1).

Discussions:

The findings of this study showed that both male and female LAs that have been chosen by students were almost equal. In other words, both male and female LAs were have equal preferences by the students in mathematics learning particularly LAs were used to reduce their mathematics anxiety levels. This finding agreed with Ozogul, Johnson, Atkinson, and Reisslein's (2013) findings that that there was no overall significant difference in the gender preferred by students.

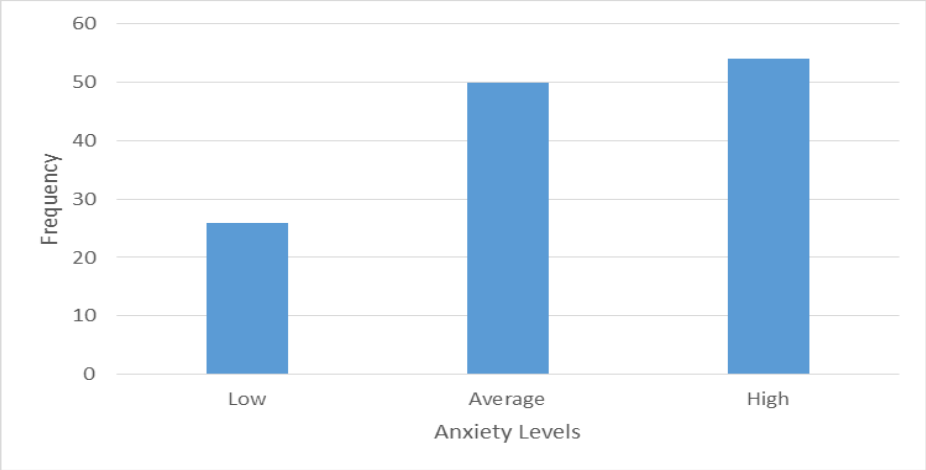

Fig. 1: Frequency of Students of Different Anxiety Levels.

Table 1: Frequency of Students' Preference on LAs' Gender.

	Low	Average	High	Total
Male	12 (9.23%)	26 (20.00%)	20 (15.38%)	58 (44.62%)
Female	11 (8.46%)	19 (14.62%)	27 (20.77%)	57 (43.85%)
No opinion	3 (2.31%)	7 (5.38%)	5 (3.85%)	15 (11.54%)
Total	26	52	52	130

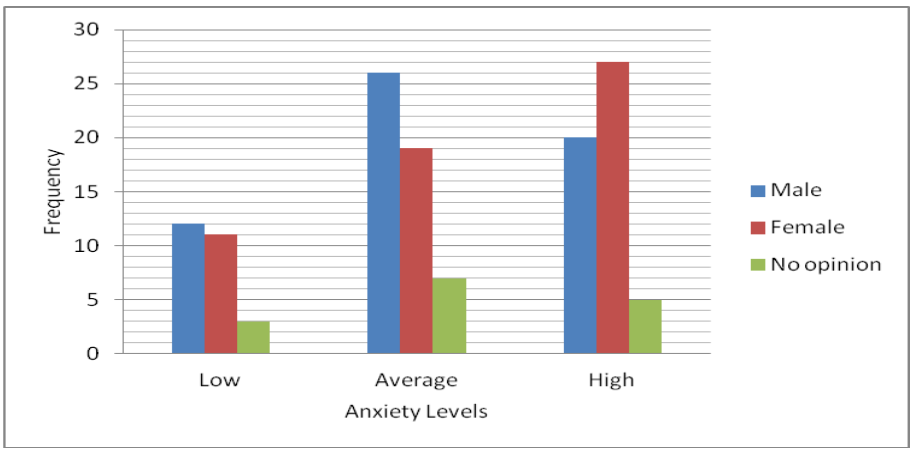

Fig. 2: Frequency of Students' Preference on LAs' Gender.

Further investigation has been done to obtain students' opinions on why they choose female or male LAs. For students who preferred learning with female LAs, they opined that they learned better with a more feminine approach LAs and have get used to learn with female lecturers. They also stated that they may have felt not comfortable if they learned with male LAs. Furthermore, other reasons that they gave were they could fully understand the subject matter if female LAs

teach them, and female was better in teaching compared to male. This opinion was aligned with Osman and Lee's findings (2012) that female LAs inspired and motivated students. In addition, it is also agreed with Baylor and Kim (2004) that students who learned with female LAs were found to have higher self-efficacy compared to students who learned with male LAs. This is also a reason why high anxious students of this study preferred female LAs in learning mathematics particularly in reducing their anxiety level. In contrast, those students who choose male LAs felt that male LAs helped them to gain better understanding in mathematical questions. This view concurred with Kim et al.'s (2007) findings where male LAs motivated students in learning. Students of this study provided this opinion were based on their learning experience with male teachers in school or college before. They also provided reason that they felt less anxious when male LAs was their mathematics teacher. Students had the perception that male LAs could attract their attention more in learning, in which they have more concentration in LA's teaching and during mathematics problem solving process. Moreover, a reason given by students who have chosen LAs of same gender was they felt comfortable when learning with LAs who is same gender with them. This was in line with Ozogul, Johnson, Atkinson, and Reisslein's (2013) finding. Students of this study too felt that they will not feel embrassed when the same gender of LA delivered teaching materials to them.

Conclusion:

The findings of this study would be significant to educators in developing their learning system with LAs. Educators could design both male and female LAs as the options for students to choose instead of having LAs of one sex only. In other words, students, based on their own preferences, may have more choices of choosing either male or female LA as their teachers, tutors, or learning companion.

Furthermore, this study has contributed in terms of literature review to other related research and future research.

It is suggested that further research could be extended to examine the preferences of students of same gender with LAs based on the anxiety levels. In addition, reasons of low and average anxious students preferred male LAs while students of high anxiety level preferred female LAs could be further found in future studies. Also, future research could be conducted to investigate and examine the effects of the LAs' gender preferences of students of different anxiety levels on stduents' mathematics achievement and attitude towards mathematics or other subjects.

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