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**The Relationship between Learners' Motivation,
Gender and Completion of MOOCs in Saudi Arabia**

BY

Dr. Farraj Ali Alshehri

Learning Solutions Principal Consultant

Saudi Arabia *Abstract*

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Abstract

This study examined the relationship among learners' motivation, gender, and completion of MOOCs in Saudi Arabia. Keller's ARCS motivation model was used as the theoretical framework. In this non-experimental survey study, 238 Saudi learners of MOOCs completed the Instructional Materials Motivation Survey (IMMS).

Chi-square tests, independent samples *t*-tests, multiple regression, and logistic regression were used to analyze the data. The findings showed a low dropout rate and a significant relationship between gender and motivation in MOOCs. Also, females indicated higher motivation levels than males. In addition, there was a positive relationship between learners' motivation and completion of MOOCs.

Keywords: MOOCs- e-courses- Keeler's motivation model- education design.

العلاقة بين التحفيز ونسبة الاكمال بين الجنسين خلال الالتحاق بمواد الموكس في المملكة العربية السعودية

د. فراج علي الشهري

المستخلص

هذه الدراسة تركز على العلاقة بين تحفيز المتعلمين، ونوع الجنس، ونسبة الاكمال في المقررات المفتوحة واسعة النطاق. تم استخدام نموذج التحفيز ARCS لكثير كإطار نظري في هذه الدراسة. شملت عينة الدراسة ٢٣٨ متعلم موكس سعودي، جميعهم أكلموا تعبئة الاستبانة (IMMS) Instructional Materials Motivation Survey. لتحليل البيانات، تم استخدام Chi-square tests و independent samples *t*-tests و multiple regression و logistic regression. أظهرت النتائج معدل تسرب منخفض، وعلاقة ذات دلالة إحصائية بين نوع الجنس والتحفيز في MOOCs. كما أشارت إلى أن الإناث عكسوا مستويات تحفيز أعلى من الذكور. بالإضافة إلى ذلك، كانت هناك علاقة إيجابية بين تحفيز المتعلمين وإكمال المقررات المفتوحة واسعة النطاق (MOOCs).

الكلمات المفتاحية: موكس- المقررات المفتوحة واسعة النطاق-المقررات الإلكترونية- التصميم التعليمي-التحفيز-التسرب

Introduction to the study

The term MOOC was created by the manager of web communications and innovations at the University of Prince Edward Island, and host of the weekly EdTechTalk webcast, David Cormier. Cormier unveiled the term Massive Open Online Courses in an EdTechTalk interview in 2008 (Haber, 2014). In addition, Haber pointed out that in the summer of 2011, professors from Stanford University started providing video via the school's Open Classroom learning portal to anyone worldwide. By the fall of 2011, 160,000 learners were enrolled, and by the following spring, the year of MOOCs began.

Massive open online courses (MOOCs) are attractive to many researchers due to their modernity and proliferation (St. Clair, Winer, Finkelstein, Fuentes-Steeves & Wald, 2015). MOOCs are online courses with free enrollment and are normally characterized as having a large number of registered learners (Li, 2015). Open refers to online courses that are not confined to certain students or organizations. Online involves all web courses provided through the Internet, and the term courses consists of content and activities provided by institutions and shared between the instructors and students (Li, 2015). In addition, MOOCs are divided into cMOOCs and xMOOCs. The 'c' in cMOOCs refers to the connectivist theory. Specifically, the cMOOCs concept is known as "a huge network of connected people and resources, within which each learner can plot their own course where learning is concerned" (Clarà & Barberà, 2014, p. 189). Alternatively, the 'x' in xMOOCs refers to the term extended. xMOOCs are "more traditional, content based, and more closely resemble traditional educational models" (El-Hmoudova, 2014, p. 30). Because xMOOCs can accommodate more learning experiences and are more organized than cMOOCs (O'Toole, 2013), with components like auto-graded assignments with deadlines and programming exams, xMOOCs are quickly growing and are provided by many institutions such as Coursera, Edx, and Udacity (Li, 2015).

Problem Statement

MOOCs have been hampered by very high dropout rates (Adamopoulos, 2013), especially when compared to traditional classes (Li, 2015). Thus, although there is a large number of registrants in MOOCs, the course completion rates range between 5% and 12% of registrants, which indicates high dropout rates (Haber, 2014; Ho, Reich, Nesterko, Seaton, Mullaney, Waldo, & Chuang, 2014; Koller, Ng,

Chuong, & Chen, 2013; Perna, Ruby, Boruch, Wang, Scull, Ahmad, & Evans, 2014).

Research suggests that lack of motivation is a major reason for dropping out of MOOCs (Huang & Hew, 2010; Perna et al., 2014), although completion of MOOCs could be affected by several factors. For example, Lee and Choi (2011) identified three components that impact the completion rate of learners: student characteristics, environmental factors, and course and program design. Students' characteristics denote learners' experiences, personalities, backgrounds, and educational levels. Environmental factors include learners' relationships with families, tasks other than MOOCs, and learners' life responsibilities. Students' characteristics and environmental factors are often difficult to control because MOOCs are open to anyone from anywhere, and some courses contain over 10,000 learners (Lee & Choi, 2011). Given the large number of MOOC-enrolled learners, MOOCs' designers should be cognizant of the large student numbers and ensure that learners are engaged and motivated (Pappano, 2012). Course and program design involves the way courses and programs are created, how their content is exhibited and delivered, and how activities for learners can meet their various needs, thus providing sufficient motivation. Therefore, taking steps to create MOOC designs appropriate for learners is crucial to aiding student retention. Focusing on factors that improve course and program design is more essential and beneficial overall than simply concentrating on individual learners' cases or environmental factors (Lee & Choi, 2011; Zheng, Rosson, Shih & Carroll, 2015).

According to the scholarly literature, because motivation can impact students' learning (Cheng & Yeh, 2009; Keller, 1984, 2000; Malik, 2014), lack of motivation might be one of the major factors that causes the decreasing completion rates of MOOCs (Huang & Hew, 2010; Perna et al., 2014). Adamopoulos (2013), Jordan (2014), and Perna et al. (2014) also asserted that the lack of motivation eventually led students to drop out of their MOOCs. Thus, further research that undertakes an assessment of learners' motivation in MOOCs and the relationship between motivation and completion rates may aid the development of future MOOC designs and hopefully reduce their high dropout rate. Moreover, most studies were conducted in Western countries, and similar studies in Saudi Arabia are rare or maybe non-existent.

As Saudi Arabia has just begun using MOOCs such as Rwaq (Adham & Lundqvist, 2015) since 2013, assessing the importance of motivation in MOOCs may help support learners and help them to

succeed. Hopefully, this will positively impact future MOOC designs. Saudi Arabia has certain characteristics that differ from other countries, especially regarding its social life and educational system. Those characteristics might make generalizing solutions from previous research conducted in some developed countries such as the United States unhelpful when applied in Saudi Arabia because of its specificity in social and educational aspects.

For example, the Saudi educational system has adopted a single-sex education system (Alrashidi & Phan, 2015). Single-sex education dictates that male learners attend and study in buildings or classrooms separate from their female counterparts (Bofah & Hannula, 2016). Thus, males do not interact with females in the same educational institutions. Each gender has its own faculty and separate curricula, e.g. a home economics course, which is provided for female students only. However, having a single-sex education system may encourage learners to move on to be educated with online system learning such as MOOCs, where they can benefit from other students' contributions regardless of their gender differences because MOOCs are open for everyone regardless of gender. For instance, MOOCs as a coeducation online learning experience provide opportunities to learn and communicate regardless of the gender type without conflicting with learners' values (Alanazy, 2011) as well as avoiding dedicating the differences that happen because of single-sex education (Matthews, 2005). It is worth mentioning that Saudi students indicate their positive attitude toward coeducation online learning, especially females who showed more positive attitudes in Alanazy (2011) study. At the same time in MOOCs, instructors can be either male or female. Having instructors from both genders might provide more opportunities for the learners to gain more knowledge and skills. Some MOOCs may provide some courses that cannot be available in the schools or universities for both genders or some courses that are only available for males but not for females, such as physical education. In this case, MOOCs could be considered as a good option for females to learn about these fields. Regarding social life, there is another difference, in that women are not allowed to drive vehicles (Hamdan, 2005) until the time of conducting this current study, which shapes a special community. Female learners usually are taken to school by their relatives, and some need to pay for transportation to and from universities. However, the nature of MOOCs hopefully reduces these losses in terms of money, effort, and time. Female students should not need to pay for transportation or ask relatives to take them to a certain school.

They are learning at places of their convenience. These factors needed to be considered while assessing completion of MOOCs and the relationship between completion and motivation.

Due to the aforementioned considerations, this proposed research study aimed to assess the relationship between learners' motivation and completion of MOOCs and to examine the persistent problem of low MOOC completion rates. In addition, this study assessed the potential gender effect on the relationship between motivation and completion of MOOCs. The research has found a potential relationship between online learning and learners' motivation (Cheng & Yeh, 2009; Keller, 1984, 2000; Malik, 2014) and the lack of motivation leads to MOOCs attrition (Huang & Hew, 2010; Perna et al., 2014). Therefore, the current study sought to rely on a theory appropriate for both MOOCs and MOOC learners' motivation. ARCS (Attention, Relevance, Confidence, and Satisfaction) motivation theory was chosen because it concentrates on integrating learner motivation into instructional design (Keller, 2000), and using ARCS motivational principles in MOOC designs shows a positive effect in regard to completion rates (Malik, 2014). In addition, the Instructional Materials Motivation Survey (IMMS) developed based on the Keller motivation theory "can be used to estimate learners' motivational attitudes in the context of virtually any delivery system" (Keller, 2009, p. 277). This survey was used in this study to collect data because it matched the goal of this study. Additionally, it was hoped the study would supplement the scholarly literature of the educational technology field, particularly pertaining to MOOCs.

Purpose of Research

The current research attempted to assess the relationship among the learners' motivation, gender, and completion of MOOCs in Saudi Arabia by using the ARCS motivation model as a theoretical framework.

Research Questions

Based on an examination of the literature, the following question, sub-questions, and hypotheses were posed: What is the extent of the relationship between learners' motivation and completion of MOOCs?

1. What is the relationship between gender and completion of MOOCs?
2. What is the relationship between gender and motivation (ARCS)?
3. What is the extent of the relationship between learners' motivation and completion of MOOCs?

Significance of the Study

A major concern about MOOCs is their high attrition rate. Lack of motivation might be considered as a major cause for the high dropout issue; therefore, the current study assessed the relationship between learners' motivation and completion of MOOCs. Although studies (Huang & Hew, 2010; Malik, 2014) exist about the possible correlation between learners' motivation and completion rates of MOOCs, almost no peer-reviewed studies have been undertaken in Saudi Arabia about this possible relationship. This indicates that motivation plays an important role in completion of MOOCs. The current study used a survey to assess the dilemma of low MOOC completion and aid in the design of MOOCs to further engage students and enhance their motivation to complete MOOCs, especially in Saudi Arabia, and in the greater world. It was hoped the study would provide a picture of MOOCs and their learners in Saudi Arabia to identify developmental goals. In addition, it sought to provide recommendations for MOOC providers such as Rawaq, KKUX, ELearning-Academy Arabic, Zadi, and Edrak, thus contributing to strengthening MOOC design to engage students and increase their motivation to complete MOOCs in Saudi Arabia.

Research Assumptions

It was assumed that Keller's (1984) ARCS theory instrument has resulted in reliable scores and has been an accurate predictor of assessing learners' motivation. It was assumed that using the Instructional Materials Motivation Survey (IMMS) would generate reliable and valid scores for the selected population in the current study. In addition, it was also assumed the participants, who are all Saudi learners in MOOCs, willingly and voluntarily participated and responded to the survey honestly and without any bias. Also, it was assumed that distributing the survey electronically through the NIU Qualtrics link would be more convenient for MOOC learners, who were learning remotely, and would give them the opportunity to participate at a convenient time and place. It was assumed that all participants had taken at least one MOOC. This assumption was assessed by adding an item into the survey that asked if the participant had taken a MOOC.

Definition of Key Terms

ARCS model: Keller's (2000) ARCS theory is a motivational approach that emphasizes integrating learner motivation into instructional design. The ARCS acronym denotes four characteristics: (A) attention, (R)

relevance, (C) confidence, and (S) satisfaction

Attention: the natural curiosity to explore unexpected thing. It consists of three categories; capture interest, stimulate inquiry, and maintain attention. (Keller, 2000)

cMOOCs: MOOCs in which learners control their course in a huge network of people and resources. The 'c' refers to the connectivist theory. (Clarà & Barberà, 2014).

Confidence: positive anticipation toward a course and its components. It consists of three categories: success expectations, success opportunities, and personal responsibility. (Keller, 2000).

Expectancy Theory: Tolman's and Lewin's expectancy-value theory "presumes that people are motivated to learn if there is value in the knowledge presented and if there is an optimistic expectation for success" (as cited in Malik, 2014, p. 195).

MOOCs: Massive Open Online Courses are open for anyone everywhere and are usually free.

Relevance: relationship between learners and the instructions. It consists of three categories: relate to goals, match interests, and tie to experiences. (Keller, 2000).

Satisfaction: The learners' positive feelings about their learning and achievements. It consists of three categories: intrinsic satisfaction, rewarding outcomes, and fair treatment (Keller, 2000).

xMOOCs: such as Coursera, Edx, and Udacity. MOOCs in which the content is more organized (O'Toole, 2013) and more traditional (El-Hmoudova, 2014).

Methodology

Design of the Study

A non-experimental survey research methodology was employed. “Instances where surveys are most suitable are to assess trends or characteristics of a population; learn about individual attitudes, opinions, beliefs, and practices; evaluate the success or effectiveness of a program; or identify the needs of a community” (Creswell, 2014, p. 403). In addition, using survey research was a good option for saving time and money as the researcher distributed the survey electronically and received the data in a short time. It was also a beneficial choice when taking into account the target population and the distance the sample is from the researcher’s residence. Using a survey was crucial to collecting more data, especially when the researcher was adopting a self-selected convenience sample. The (IMMS) survey was adopted as an instrument to assess motivation from the four dimensions of ARCS theory: attention, relevance, confidence, and satisfaction.

Participants

The study addressed Saudi MOOC learners. Thus, the survey was sent to everyone who had enrolled in any of the MOOCs after the MOOCs had been finished, regardless of whether the enrolled learners completed the MOOC or not. The researcher emailed all the MOOCs learners through their MOOC platforms and Twitter accounts in May 2017. The MOOC platforms were Rawaq, KKUX, ELearning-Academy Arabic, Zadi, and Edrak.

Three hundred thirty-seven Saudi MOOC learners participated in the study, but 99 cases were removed from the sample because of a high percentage of missing values. Thus, data from 238 Saudi learners (52.5% were male and 47.5% were female) were used in this study. The respondents were asked about their nationality to ensure that all the participants are Saudis, thus learners of other nationalities were excluded from the sample. Most of the participants were 21-25 years old (21%) or 26-30 years old (21%). Learners who were 31-35 years old represented 15% of the sample. In addition, learners 36-40 years old represented 19% of the sample as well as learners over 40 years old. Only 5% of the participants were less than 20 years old. Regarding the participants’ educational degrees, about 13% had a high school degree, 25% had master’s degrees, 7% had doctoral degrees, and only 4% had other degrees. Most of the participants had bachelor’s degrees (51%).

Regarding the participants' marital status, most of them were married (52%) or single (45%). Only 1% were divorced, and 0.4% reflected other marital statuses. In general, the participants' MOOCs fields were varied. About 30% of the participants were taking Technology and Engineering MOOCs, 20% were taking Human and Social Science MOOCs, 16% were taking Administrative Sciences MOOCs, 12% were taking Educational Sciences MOOCs, and the others were taking MOOCs in different fields that represented less than 10% such as Financial Sciences and Medicine and Health Sciences MOOCs. The majority of the participants had currently taken a MOOC and completed it (70%), but 30% had not completed one.

For the logistic regression in the current study, the researcher used $\alpha = 0.05$, two tailed tests, and power = 0.80. It was assumed that the magnitude of the effect size was moderate (OR = 3.47). Based on power analysis using G*Power, 44 participants were the minimum required size for the smallest group. For the linear regression analysis, the researcher determined required sample size for $\alpha = 0.05$, two tailed test, and power = 0.90. It assumed that the magnitude of the effect size was $f^2 = 0.33$. Based on G*Power, 34 participants are the minimum required size for the regression analysis (see Appendix A).

Instrumentation

The Instructional Materials Motivation Survey (IMMS) was employed in the current study. The IMMS survey is used to assess the instructional materials and whether they meet ARCS principles and to explore learners' motivation levels. In addition, scores from the survey have shown good internal consistency and validity to explore learners' motivation in e-learning (Huang & Hew, 2010). The researcher obtained permission from the author to use the IMMS survey (see Appendix B).

The IMMS survey measures the learners' motivation levels with a Likert scale, which contains items and subscales. The four subscales are attention (12 items), relevance (9 items), confidence (9 items), and satisfaction (6 items).

In addition, some questions were added to the survey. To assess whether the participants have completed their MOOCs, the following question was placed in the survey: Considering the most recent MOOC you have taken, did you complete it? Some general demographic questions were included at the start of the survey such as age, educational background, and marital status. An open-ended question was

added at the end of the survey: What three factors are important to help ensure that you complete a MOOC? In addition, to ensure that the sample participants were Saudis, the following question was added to the survey: What nationality are you?

The survey was translated into Arabic for non-English speakers (see Appendix D). To establish face validity of the translated instrument, at least two doctoral students from different backgrounds who are proficient in Arabic and English looked at the translation. The researcher found that Keller (2009) had conducted a pilot study with 90 participants, and showed that the IMMS items' scores were reliable based on values of Cronbach's alpha (see Table 1).

Table 1
Cronbach's Alpha Coefficients for IMMS Instrument

| Scale | Reliability Estimate (Cronbach's alpha) |
|--------------|---|
| Attention | .89 |
| Relevance | .81 |
| Confidence | .90 |
| Satisfaction | .92 |
| Total Scale | .96 |

Research Procedures

Self-selected convenience sampling was employed in the current study. The participants who were Rawaq, KKUX, ELearning-Academy Arabic, Zadi, and Edrak MOOCs' learners received the survey electronically through the email addresses they used for their MOOC enrollment. The researcher hoped that more than 1000 learners would receive the survey. The survey was created through NIU Qualtrics and distributed as soon as the MOOCs were completed. They were sent to everyone who had enrolled in the five platforms of MOOCs that were available. The survey was available for about one month. The researcher did not need to send a reminder due to a sufficient number of participants responding.

Description of Sample

The survey was distributed electronically through various Saudi MOOCs platforms, such as Rwaq and KKUx. A total of 552 MOOC learners participated in the survey. Of these respondents, 337 were Saudi learners and, among these Saudi learners, 99 cases were removed from the sample because of a high percentage of missing values. For other missing values, the researcher assessed whether they were missing

completely at random (MCAR) using Little’s (1988) test. Results from this test ($p = .48$) provided no evidence against the assumption of MCAR. Thus, the researcher applied hot-deck Imputation to impute the missing values (see Appendix G). The analytic sample thus consisted of $N = 238$ MOOCs’ Saudi learners. The “highest degree earned” variable was coded as 1= *high school*, 2 = *bachelor*, 3= *master*, and 4= *doctorate*. Values of 5 = *other* (constituting 4.2% of the values) were regarded as missing. The researcher created dummy variables for gender, marital status and completion rate to facilitate their use in regression. Gender was dummy-coded 0 for *male* and 1 for *female*; marital status was dummy-coded as 1 for *married* and 0 for *not married*; and completion was dummy-coded as 0 for *no* and 1 for *yes*. The researcher included age, marital status, and highest education degree earned as control variables.

Categorical Variables (Demographics)

This section provides distributional and descriptive information about gender, age, marital status, and highest education degree earned.

Gender

The participants were asked to identify their gender. A total of 113 (47.5%) of the participants were female, whereas 125 (52.5%) were male (see Table 2).

Table 2

Distribution of Participants’ Gender

| Gender | <i>Frequency</i> | Percent |
|--------|------------------|---------|
| Female | 113 | 47.5% |
| Male | 125 | 52.5% |
| Total | 238 | 100.0% |

Age

A total of 11 (4.6%) of the participants were under 20 years of age, which constituted the smallest group. The remaining age categories showed 51 (21%) who were 21 to 25 years, 51 (21%) who were 26 to 30 years, 36 (15%) who were 31 to 35 years, 45 (18.9%) who were 36 to 40 years, and 44 (19%) who were older than 40 (see Table 3).

Table 3
Distribution of Participants' Age

| Age | Frequency | Percent |
|--------------------|-----------|---------|
| 20 years or less | 11 | 5% |
| 21-25 years | 51 | 21% |
| 26-30 years | 51 | 21% |
| 31-35 years | 36 | 15% |
| 36-40 years | 45 | 19% |
| More than 40 years | 44 | 19% |
| Total | 238 | 100.0% |

Highest Education Degree

The participants indicated the highest degree they had earned. A total of 31 (13%) had a high school degree, 121 (51%) had a bachelor's degree, 60 (25%) had a master's degree, and 16 (7%) had a doctoral degree. Ten participants (4%) chose other, and they represented the smallest group (see Table 4).

Table 4
Distribution of Participants' Highest Degree

| Highest degree earned | Frequency | Percent |
|-----------------------|-----------|---------|
| High school | 31 | 13% |
| Bachelor | 121 | 51% |
| Master | 60 | 25% |
| Doctorate | 16 | 7% |
| Other | 10 | 4% |
| Total | 238 | 100% |

Marital Status

In the survey, participants had four options to indicate their marital status: single, married, divorced, and other. One hundred seven (45%) were single, 127 (52%) were married, 3 (1%) were divorced, and only one participant (0.4%) chose other (see Table 5).

Table 5
Distribution of Participants’ Marital Status

| Marital status | Frequency | Percent |
|----------------|-----------|---------|
| Single | 107 | 45% |
| Married | 127 | 53% |
| Divorced | 3 | 1% |
| Other | 1 | 0.4% |
| Total | 238 | 100 % |

Quantitative Variables

This section presents the four constructs of ARCS motivation. Each construct was measured using a Likert scale. The following designators were used for the subscales: “A” refers to attention, which has 12 items; “R” refers to relevance, which has 9 items; “C” refers to confidence, which has 9 items; and “S” refers to satisfaction, which has 6 items. The participants responded to each item based on five-point Likert items (1= *strongly disagree*, 2 = *disagree*, 3= *neutral*, 4= *agree*, and 5= *strongly agree*). Items 4, 5, 8, 11, 12, 19, 23, 25, 27, 29 were reverse-coded, as they were negatively worded. Cronbach’s alpha was computed to assess the internal consistency reliability of scores from the instrument. The reliability of the overall 36-item ARCS scale was good (alpha = 0.94). In addition, each construct showed a value of Cronbach’s alpha above 0.70 (see Table 6). Prior to regression analysis, the overall motivation, attention, relevance, confidence, and satisfaction scores were transformed to z-scores to facilitate interpretation of effects and to mean-center the values.

Table 6
Cronbach’s Alpha Coefficient Values for Constructs

| Constructs | Corresponding Items | Alpha |
|---------------------------|---------------------|-------|
| Attention | 1-12 (12 items) | 0.81 |
| Relevance | 13-21 (9 items) | 0.80 |
| Confidence | 22-30 (9 items) | 0.85 |
| Satisfaction | 31-36 (6 items) | 0.92 |
| Overall (ARCS Motivation) | 1-36 (36 items) | 0.94 |

This section presents the results pertaining to the overall participants’ ARCS motivation and each of the four constructs (attention, relevance, confidence, and satisfaction). The overall motivation of the participants was computed by averaging, for each participant, across the 36 items of all the four ARCS constructs (attention, relevance, confidence, and satisfaction). The overall mean was $M = 3.79$ and the standard deviation was $SD = 0.52$ (see Table 7). In addition, there were no observed extreme values.

Table 7

Descriptive Statistics of the Participants’ Overall ARCS Motivation

| Variable | <i>M</i> | <i>SD</i> | Skewness | Kurtosis |
|-------------------------|----------|-----------|----------|----------|
| Overall ARCS motivation | 3.79 | 0.52 | - 0.19 | 0.29 |

In a similar manner, the attention subscale scores were computed as the mean across the 12 attention item scores. The attention subscale mean score was $M = 3.70$ and the standard deviation was $SD= 0.55$ (see Table 8).

Table 8

Descriptive Statistics of the Participants’ Attention Subscale Scores

| Variable | <i>M</i> | <i>SD</i> | Skewness | Kurtosis |
|-----------|----------|-----------|----------|----------|
| Attention | 3.70 | 0.55 | 0.12 | -0.36 |

In addition, the relevance subscale scores were computed as the mean across the nine relevance item scores. The relevance subscale mean score was $M = 3.88$ and the standard deviation was $SD= 0.61$ (see Table 9). Also, there were no outliers.

Table 9

Descriptive Statistics of the Participants’ Relevance Subscale Scores

| Variable | <i>M</i> | <i>SD</i> | Skewness | Kurtosis |
|-----------|----------|-----------|----------|----------|
| Relevance | 3.88 | 0.61 | -0.73 | 1.15 |

The confidence subscale scores were computed as the mean across the nine item scores. The confidence subscale mean score was $M = 3.76$ and the standard deviation was $SD= 0.57$ (see Table 10).

Table 10

Descriptive Statistics of the Participants' Confidence Subscale Scores

| Variable | <i>M</i> | <i>SD</i> | Skewness | Kurtosis |
|------------|----------|-----------|----------|----------|
| Confidence | 3.76 | 0.57 | 0.18 | -0.44 |

Satisfaction was the last subscale that was computed as the mean across the six satisfaction item scores. The satisfaction subscale mean was $M = 3.91$ and the standard deviation was $SD = 0.76$ (see Table 11).

Table 11

Descriptive Statistic of the Participants' Satisfaction Subscale Scores

| Variable | <i>M</i> | <i>SD</i> | Skewness | Kurtosis |
|--------------|----------|-----------|----------|----------|
| Satisfaction | 3.91 | 0.76 | -0.79 | 1.07 |

Research Question 1 Findings

This section presents the results pertaining to research question 1: What is the relationship between gender and completion of MOOCs? The intent of question 1 was to assess the potential relationship between gender and MOOCs. In addition, however, the analyses assessed the relationship among age, marital status, and highest degree with MOOC completion. A chi-square test of independence as well as logistic regression were applied to answer this research question.

Chi-square Test of Independence

The null hypotheses assessed in this analysis was H_0 : there is no relationship between gender and completion of MOOCs. Table 12 shows the cross-classification of these two variables together with expected values under the assumption of independence. The results of this test showed no statistically significant relationship between gender and MOOC completion, $\chi^2(1, N = 238) = 1.85, p = .17$.

Table 12
Gender × MOOCS Completion Cross-Tabulation

| | | Completion | | Total | |
|--------|--------|----------------|------|-------|-----|
| | | No | Yes | | |
| Gender | male | Count | 33 | 92 | 125 |
| | | Expected Count | 37.8 | 87.2 | 125 |
| | female | Count | 39 | 74 | 113 |
| | | Expected Count | 34.2 | 78.8 | 113 |
| | Total | Count | 72 | 166 | 238 |
| | | Expected Count | 72.0 | 166.0 | 238 |

Logistic Regression

Logistic regression was carried out to assess how gender predicted MOOC completion, controlling for age, marital status, and highest degree earned. Highest degree earned was represented by responses to the item “what is the highest education degree you have earned?” with response options *High school, Bachelor’s degree, or Master’s, Doctoral degree, and Other*. To facilitate use of this variable as an ordinal predictor, cases with response of Other (4.2% of cases) were excluded from the analyses. Based on an omnibus test of model coefficients, the model with the predictors did not fit significantly better than the intercept-only model, $\chi^2(4, N = 238) = 2.21, p = .70$. But the Hosmer and Lemeshow goodness-of-fit test indicated that the model fit the data, $\chi^2(8, N = 238) = 5.76, p = .68$. However, examination of the tests of significance for each individual predictor showed that none of the variables significantly predicted whether participants would complete a MOOC (see Table 13).

Table 13

Results for Logistic Regression of MOOC Completion on Gender, Age, Marital Status, Highest Degree

| | <i>B</i> | <i>S.E.</i> | Wald | <i>df</i> | <i>P</i> | OR | 95% C.I.for OR | |
|-------------------|----------|-------------|------|-----------|----------|------|----------------|-------|
| | | | | | | | Low er | Upper |
| Gender | -0.42 | 0.31 | 1.84 | 1 | .18 | 0.65 | 0.35 | 1.21 |
| Age | 0.05 | 0.13 | 0.12 | 1 | .73 | 1.05 | 0.81 | 1.36 |
| Marital Status | -0.14 | 0.39 | 0.13 | 1 | .71 | 0.87 | 0.41 | 1.85 |
| Highest degree | -0.10 | 0.22 | 0.19 | 1 | .66 | 0.91 | 0.59 | 1.41 |
| Constant | 1.17 | 0.53 | 4.81 | 1 | .03 | 3.22 | | |

Research Question 2 Findings

This section presents the results for research question 2: What is the relationship between gender and motivation (ARCS). To address this research question, a two independent samples *t*-test as well as a multiple regression were carried out.

Independent Samples t-Test for Overall Score

Table 7 shows descriptive statistics for the overall motivation score as well as for each of the four subscales. Independent samples *t*-tests were applied to assess the mean gender differences in overall motivation, attention, relevance, confidence, and satisfaction. To adjust for the multiple comparisons being made, a Bonferroni correction was made to the alpha level, where each test was evaluated using $\alpha = .05/5 = .01$.

Independent Samples t-Test for Subscale Scores

Based on the results, males and females differed on each of the subscale scores regarding their overall motivation, $t(234.27) = -2.54, p < .001, d = 0.5$; relevance, $t(234.95) = -2.82, p = .005, d = 1.13$; confidence, $t(236) = -3.82, p < .001, d = 0.5$; and satisfaction, $t(229.77) = -3.30, p = .001, d = 0.5$ except attention, $t(235.81) = -2.46, p = .015, d = 0.3$. Levene's test for equality of variance was statistically significant ($p < .05$) for each outcome except Confidence ($p = .20$; see Table 17). Females scored higher than males in overall motivation, attention, relevance, confidence, and satisfaction (see Table 15). In addition, Cohen's d indicated a moderate effect size for the subscales, except for the relevance subscale, which showed a large effect ($d = 1.13$).

Examination of residual values shows a close-to-normal distribution for overall motivation (Figure 1), attention (Figure 2), and confidence (Figure 3). Residuals for relevance and satisfaction were slightly negatively skewed (Figures 4 & 5).

Table 14

Subscales Statistics

| | Male | | | | Female | | | |
|--------------|----------|----------|-----------|-----------|----------|----------|-----------|-----------|
| | <i>N</i> | <i>M</i> | <i>SD</i> | <i>SE</i> | <i>N</i> | <i>M</i> | <i>SD</i> | <i>SE</i> |
| Overall | 125 | 3.68 | 0.55 | 0.05 | 113 | 3.92 | 0.46 | 0.04 |
| Motivation | | | | | | | | |
| Attention | 125 | 3.62 | 0.58 | 0.05 | 113 | 3.79 | 0.51 | 0.05 |
| Relevance | 125 | 3.78 | 0.65 | 0.06 | 113 | 4.00 | 0.55 | 0.05 |
| Confidence | 125 | 3.63 | 0.57 | 0.05 | 113 | 3.90 | 0.53 | 0.05 |
| Satisfaction | 125 | 3.76 | 0.83 | 0.07 | 113 | 4.08 | 0.63 | 0.06 |

Table 15
Independent Sample Tests

| | | Levene's Test for Equality of Variances | | t-test for Equality of Means | | | | | | |
|--------------------|-----------------------------|---|----------|------------------------------|-----------|---------------------|-----------------|-----------------------|---|------|
| | | <i>F</i> | <i>p</i> | <i>T</i> | <i>df</i> | <i>p</i> (2-tailed) | Mean Difference | Std. Error Difference | 95% Interval Confidence of the Differences Lower Upper | |
| Overall Motivation | Equal variances assumed | 4.45 | .036 | -3.51 | 236 | .001 | -.23 | .07 | -.36 | -.10 |
| | Equal variances not assumed | | | -2.54 | 234.27 | <.001 | -.17 | .07 | -.36 | -.10 |
| Attention | Equal variances assumed | 4.51 | .035 | -2.45 | 236 | .015 | -.17 | .07 | -.31 | -.03 |
| | Equal variances not assumed | | | -2.46 | 235.81 | .015 | -.17 | .07 | -.31 | -.03 |
| Relevance | Equal variances assumed | 3.74 | .054 | -2.80 | 236 | .006 | -.22 | .08 | -.37 | -.06 |
| | Equal variances not assumed | | | -2.82 | 234.95 | .005 | -.22 | .08 | -.37 | -.07 |
| Confidence | Equal variances assumed | 1.68 | .196 | -3.82 | 236 | <.001 | -.27 | .07 | -.41 | -.13 |
| | Equal variances not assumed | | | -3.83 | 235.94 | <.001 | -.27 | .07 | -.41 | -.13 |
| Satisfaction | Equal variances assumed | 7.04 | .008 | -3.25 | 236 | .001 | -.31 | .10 | -.50 | -.12 |
| | Equal variances not assumed | | | -3.30 | 229.77 | .001 | -.31 | .10 | -.50 | -.13 |

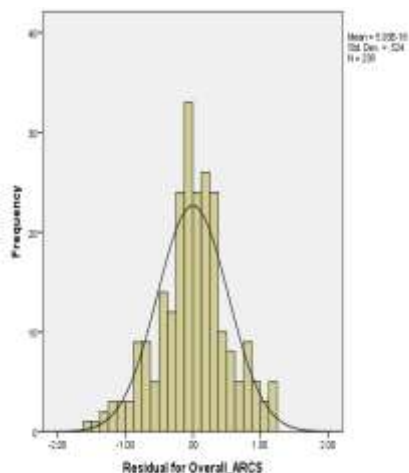


Figure 1: Distribution of residuals for regression predicting overall motivation (ARCS).

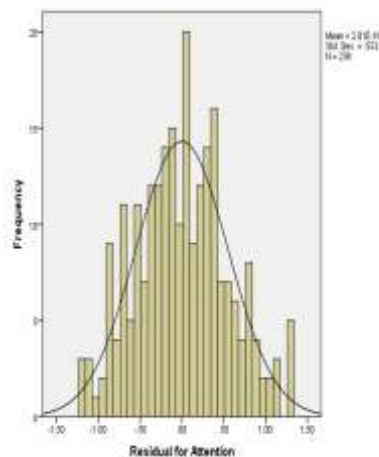


Figure 2: Distribution of residual for regression predicting attention.

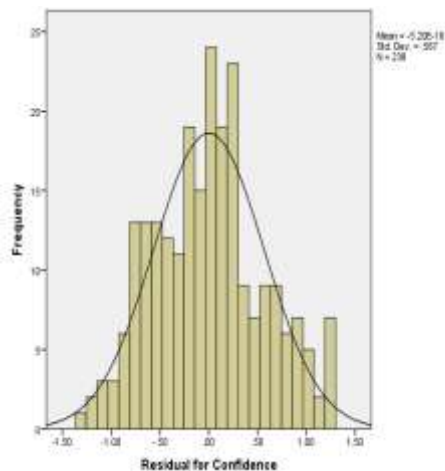


Figure 3: Distribution of residual for regression predicting confidence.

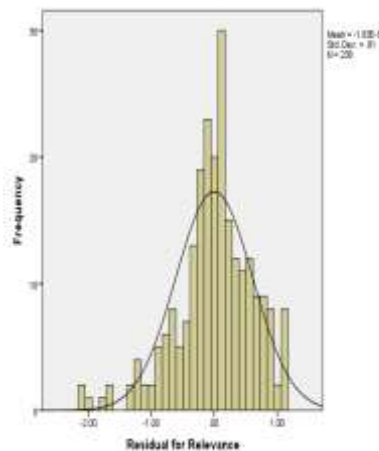


Figure 4: Distribution of residual for regression predicting relevance.

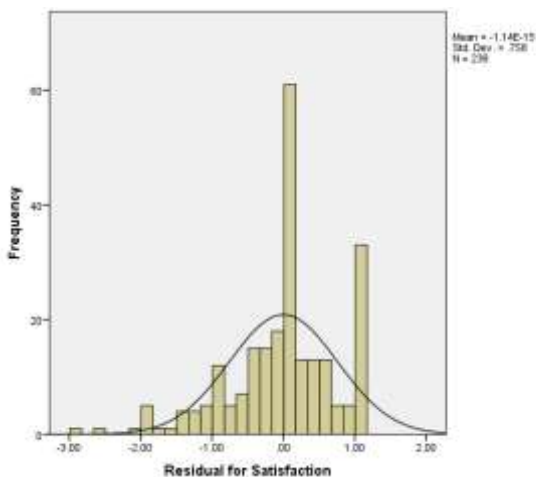


Figure 5: Distribution of residual for regression predicting satisfaction.

Multiple Regression

To examine for gender differences in motivation scores, while controlling for age, marital status, and highest degree earned, multiple regression was carried out, regressing the motivation scores on the set of predictors. The results shown in Table 16 indicate that the overall regression model significantly predicted overall motivation: $F(4, 223) = 6.22, p < .001$. Ten percent of the total variability in overall motivation (ARCS) was explained by the predictors ($R^2 = .10, R^2_{adj} = .08$). Assessment of individual predictors showed that female gender ($\beta = .18, p = .01$), age ($\beta = .16, p = .08$), marital status ($\beta = -.21, p = .02$) and highest degree earned ($\beta = -.15, p = .04$) significantly predicted overall motivation (see Table 17).

Based on the Pratt Index, gender emerged as the most important predictor (Pratt Index = 0.02), followed by highest degree earned (Pratt Index < 0.01).

A histogram of the model residuals indicated that the residual values were normally distributed (see Figure 6). In addition, a scatter plot of the residuals on the predicted values was generated and indicated that the residuals were homoscedastic (see Figure 7). In addition, lack of multicollinearity was evident for all the predictors, with variance inflation factor values (VIF) for each of the four predictors relatively close to 1.0. Among the standardized residuals, there was one case that was marginally outlying ($z = -3.00$), but there were no standardized residuals more extreme than this value.

Table 16

ANOVA for Regression Model Predicting Motivation (ARCS, N = 238)

| Model | SS | Df | MS | F | P |
|------------|-------|-----|------|------|--------|
| Regression | 6.06 | 4 | 1.52 | 6.22 | < .001 |
| Residual | 54.37 | 223 | 0.24 | | |
| Total | 60.43 | 227 | | | |

Table 17

Summary of Regression Coefficients for the Regression of Overall Motivation on Gender, Age, Marital Status, Highest Degree

| Model | Unstandardized Coefficients | | Standardized Coefficients β | T | p | Correlations | | | Collinearity Statistics | |
|----------------|-----------------------------|------|-----------------------------------|-------|-------|--------------|---------|---------|-------------------------|------|
| | B | SE | | | | Zero-order | Partial | Partial | Tolerance | VIF |
| Constant | 3.84 | 0.12 | | 32.29 | <.001 | | | | | |
| Gender | 0.19 | 0.07 | .18 | 2.64 | .01 | 0.23 | 0.17 | 0.17 | 0.86 | 1.16 |
| Age | 0.05 | 0.03 | .16 | 1.77 | .08 | -0.10 | 0.12 | 0.11 | 0.50 | 1.99 |
| Marital Status | -0.21 | 0.09 | -.21 | -2.43 | .02 | -0.23 | 0.16 | 0.15 | 0.56 | 1.80 |
| Highest degree | -0.10 | 0.05 | -.15 | -2.03 | .04 | -0.17 | 0.14 | 0.13 | 0.70 | 1.42 |

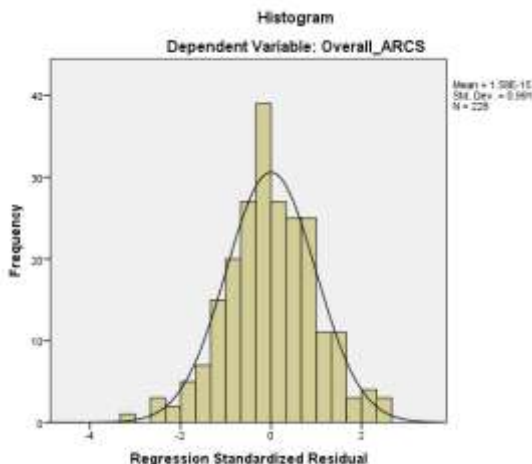


Figure 6: Histogram of the residual values for the regression predicting overall motivation (ARCS).

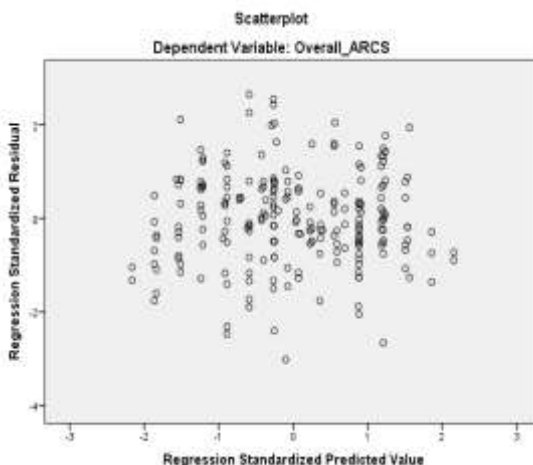


Figure 7: Scatter plot of the residual values on the predicted values for the regression predicting overall motivation (ARCS).

Research Question 3 Findings

This section presents the results of research question 3: What is the extent of the relationship between learners’ motivation and completion of MOOCs. This question sought to assess the relationship between learners’ motivation and MOOC completion. Logistic regression analyses were carried out to assess the relationship between overall motivation (ARCS) and completion as well as the relationship

among overall motivation (ARCS), gender, age, marital status and highest degree and completion of MOOCs.

Logistic Regression #1

The results from the first logistic regression indicated that, based on the omnibus test of model coefficients, the model with the single predictor fit significantly better than the intercept-only model, $\chi^2(1, N = 238) = 10.64, p = .001$. However, the Hosmer and Lemeshow test reflected that the model did not fit the data, $\chi^2(8, N = 238) = 18.09, p = .02$. However, this latter test may have been affected by the continuous nature of the predictor in the model. Examination of individual predictors showed that overall motivation (ARCS) significantly predicted MOOC completion ($b = 0.47, p = .002$). Moreover, the researcher found that each standard deviation increase in participants' overall motivation was associated with a 1.61 times increase in the odds of MOOC completion (see Table 18).

Table 18

Results for Logistic Regression of MOOC Completion on Overall Motivation

| | <i>B</i> | <i>S.E</i> | Wal d | <i>d</i> <i>f</i> | <i>P</i> | <i>OR</i> | 95% C.I.for <i>OR</i> | |
|---------------------------|----------|------------|-----------|----------------------|-----------|-----------|-----------------------|-------|
| | | | | | | | Lower | Upper |
| Overall Motivati on | 0.4 7 | 0.1 5 | 9.99 | 1 | .002 | 1.61 | 1.20 | 2.15 |
| Constant | 0.8 8 | 0.1 5 | 35.8 1 | 1 | <.00 1 | 2.40 | | |

A cross-classification table for predicting completion showed that 69% of the participants were correctly classified. With a cut value of .50, the model did better at predicting those who completed their MOOCs (96%) than it did for predicting those who did not complete (6%, see Table 19).

Table 19

Classification Table

| Observed | | Predicted | | Percentage Correct |
|--------------------|-----|---------------|----------------|--------------------|
| | | Completion No | Completion Yes | |
| Completion | No | 4 | 68 | 5.6% |
| | Yes | 6 | 160 | 96.4% |
| Overall Percentage | | | | 68.9% |

Logistic Regression #2

This regression used MOOC completion as the outcome variable, overall motivation as a predictor, and gender, age, marital status and highest degree as predictors to control for their effects. The omnibus test of model coefficients reflected that the model with predictors fit significantly better than the intercept-only model, $\chi^2(5, N = 238) = 14.01, p = .02$. Similarly, the Hosmer and Lemeshow goodness-of-fit test showed that the model fit the data, $\chi^2(8, N = 238) = 7.70, p = .46$. The results showed that overall motivation (ARCS; $b = 0.56, p = .001$) and gender ($b = -0.66, p = .05$) significantly predicted MOOC completion. Specifically, each standard deviation increase in participants' overall motivation increased the odds of MOOC completion by 1.75 times. Also, the results showed that compared to females, the odds of males completing their MOOCs were 1.92 times higher (see Table 20).

Table 20

Results for Logistic Regression of MOOC Completion on Overall Motivation, Gender, Age, Marital Status, Highest Degree

| | <i>B</i> | <i>S.E.</i> | Wald | <i>df</i> | <i>p</i> | OR | 95% C.I. for OR | |
|--------------------|----------|-------------|-------|-----------|----------|------|-----------------|-------|
| | | | | | | | Low er | Upper |
| Overall Motivation | 0.56 | 0.17 | 10.81 | 1 | .001 | 1.75 | 1.25 | 2.45 |
| Gender | -0.66 | 0.33 | 3.96 | 1 | .05 | 0.52 | 0.27 | 0.99 |
| Age | 0.003 | 0.14 | 0.00 | 1 | .99 | 1.00 | 0.77 | 1.31 |
| Marital Status | 0.07 | 0.41 | 0.03 | 1 | .86 | 1.08 | 0.48 | 2.39 |
| Highest degree | 0.003 | 0.23 | 0.000 | 1 | .99 | 1.00 | 0.64 | 1.57 |
| Constant | 1.17 | 0.55 | 4.49 | 1 | .03 | 3.22 | | |

The classification table showed that, when using a .50 cutoff criterion, 70% of the participants were correctly classified. The model did better at predicting those who completed their MOOCs (97%) than it did for predicting those who did not complete (9%, see Table 21).

Table 21

Classification Table

| Observed | | Predicted | | Percentage Correct |
|--------------------|-----|---------------|----------------|--------------------|
| | | Completion No | Completion Yes | |
| Completion | No | 6 | 63 | 8.7% |
| | Yes | 5 | 154 | 96.9% |
| Overall Percentage | | | | 70.2% |

Logistic Regression #3

This regression regressed MOOC completion on the set of ARCS motivation subscale scores. For this regression, the omnibus test of model coefficients reflected that the model with predictors fit significantly better than the intercept-only model, $\chi^2(4, N = 238) = 17.42, p = .002$. Similarly, the Hosmer and Lemeshow goodness-of-fit test showed that the model fit the data $\chi^2(8, N = 238) = 7.35, p = .50$. The regression showed that satisfaction significantly predicted MOOC completion ($b = 0.62, p = .01$). Specifically, for each standard deviation increase in the participants' satisfaction, the odds of completing MOOCs increased by 2.26 times (see Table 22).

Table 22
Results for Logistic Regression of MOOC Completion on Attention, Relevance, Confidence, Satisfaction

| | <i>B</i> | <i>S.E</i> | Wal d | <i>Df</i> | <i>P</i> | OR | 95% C.I.for OR | |
|--------------|----------|------------|----------|-----------|----------|------|----------------|-------|
| | | | | | | | Lower | Upper |
| Attention | -0.15 | 0.23 | 0.41 | 1 | .52 | 0.87 | 0.56 | 1.35 |
| Relevance | 0.16 | 0.26 | 0.39 | 1 | .53 | 1.18 | 0.71 | 1.96 |
| Confidence | -0.10 | 0.21 | 0.24 | 1 | .63 | 0.90 | 0.60 | 1.36 |
| Satisfaction | 0.62 | 0.25 | 6.22 | 1 | .01 | 1.85 | 1.14 | 3.01 |
| Constant | 0.89 | 0.15 | 35.95 | 1 | <.001 | 2.44 | | |

The cross-classification based on the logistic regression showed that, when using a 0.5 cutoff criterion, 70% of the participants were correctly classified. The model did better at predicting those who completed their MOOCs (95%) than it did for predicting those who did not complete (13%, see Table 23).

Table 23
Classification Table

| Observed | | Predicted | | Percentage Correct |
|--------------------|-----|---------------|----------------|--------------------|
| | | Completion No | Completion Yes | |
| Completion | No | 9 | 63 | 12.5% |
| | Yes | 9 | 157 | 94.6% |
| Overall Percentage | | | | 69.7% |

Logistic Regression #4

The final logistic regression predicted MOOC completion from the set of ARCS motivation subscales but controlled for gender, age, marital status, and highest degree and completion.

Block 1

The set of control variables first were entered as a block of predictors. The omnibus test of model coefficients reflected that this model did not fit significantly better than the intercept-only model, $\chi^2(4, N = 238) = 2.21, p = .70$. However, the Hosmer and Lemeshow

goodness-of-fit test showed that the model fit the data, $\chi^2(8, N = 238) = 5.76, p = .68$. In this reduced model, none of the predictors significantly predicted MOOC completion (see Table 24).

Table 24
Results for Logistic Regression of MOOC Completion on Gender, Age, Marital Status, Highest Degree

| | <i>B</i> | <i>S.E.</i> | Wald | <i>d</i> / <i>f</i> | <i>p</i> | OR | 95% C.I.for OR | |
|----------------|----------|-------------|------|------------------------|----------|------|-------------------|-----------|
| | | | | | | | Low er | Upp er |
| Gender | -0.42 | 0.31 | 1.84 | 1 | .18 | 0.65 | 0.35 | 1.21 |
| Age | 0.05 | 0.13 | 0.12 | 1 | .73 | 1.05 | 0.81 | 1.36 |
| Marital Status | -0.14 | 0.39 | 0.13 | 1 | .72 | 0.87 | 0.41 | 1.85 |
| Highest degree | -0.10 | 0.22 | 0.19 | 1 | .66 | 0.91 | 0.59 | 1.41 |
| Constant | 1.17 | 0.53 | 4.81 | 1 | .03 | 3.22 | | |

Block 2

Next, the ARCS motivation subscales were entered as a block. In this full model, the omnibus test of model coefficients reflected that the model with predictors fit significantly better than the intercept-only model, $\chi^2(8, N = 238) = 19.74, p = .01$. Similarly, the Hosmer and Lemeshow goodness-of-fit test showed that the model fit the data, $\chi^2(8, N = 238) = 6.75, p = .56$. Moreover, a chi-square difference test showed that the block of ARCS motivation subscales, taken together, significantly predicted MOOC completion over and above the initial block of control variables, $\chi^2(4, N = 238) = 17.53, p = < .001$. However, satisfaction emerged as a statistically significant predictor ($b = 0.67, p = .01$), with each standard deviation increase in the participants' satisfaction associated with a 1.94 times increase in the odds of MOOC completion (see Table 24). The results also showed that gender significantly predicted MOOC completion ($b = -0.73, p = .03$). Moreover, the results showed that compared to females, the odds of males completing their MOOCs were 2.08 times higher than females. No other predictors emerged as statistically significant.

Table 25 Results for Logistic Regression of MOOC Completion on Gender, Age, Marital Status, Highest Degree Earned, Attention, Relevance, Confidence, Satisfaction

| | <i>B</i> | <i>S.E.</i> | Wal d | <i>df</i> | <i>p</i> | OR | 95% C.I.for OR | |
|----------------|----------|-------------|----------|-----------|----------|------|-------------------|-----------|
| | | | | | | | Low er | Upp er |
| Gender | 0.73 | 0.34 | 4.59 | 1 | .03 | 0.48 | 0.25 | 0.94 |
| Age | 0.01 | 0.14 | 0.01 | 1 | .94 | 1.01 | 0.77 | 1.33 |
| Marital Status | 0.04 | 0.42 | 0.01 | 1 | .92 | 1.05 | 0.46 | 2.36 |
| Highest degree | 0.03 | 0.23 | 0.02 | 1 | .90 | 0.97 | 0.62 | 1.54 |
| Attention | 0.17 | 0.24 | 0.50 | 1 | .48 | 0.84 | 0.52 | 1.36 |
| Relevance | 0.12 | 0.27 | 0.18 | 1 | .67 | 1.12 | 0.66 | 1.91 |
| Confidence | 0.06 | 0.22 | 0.08 | 1 | .78 | 1.06 | 0.69 | 1.65 |
| Satisfaction | 0.67 | 0.26 | 6.51 | 1 | .01 | 1.94 | 1.17 | 3.24 |
| Constant | 1.28 | 0.56 | 5.20 | 1 | .02 | 3.60 | | |

The cross-classification of prediction based on this model, and using a .50 cutoff criterion, showed that 71% of the participants were correctly classified. The model did better at predicting those who completed their MOOCs (94%) than it did for predicting those who did not complete (17%, see Table 26).

**Table 26
Classification Table**

| Observed | | Predicted | | Percentage Correct |
|--------------------|-----|------------------|-----|-----------------------|
| | | Completion No | Yes | |
| Completion | No | 12 | 57 | 17.4% |
| | Yes | 10 | 149 | 93.7% |
| Overall Percentage | | | | 70.6% |

Discussion and conclusion

This chapter discusses the quantitative findings that have been collected for the current research. In addition, this chapter compares the current research results and previous findings regarding learners' gender differences, motivation, and completion of MOOCs. Further, this chapter presents the potential implications of this research, especially in instructional technology and online learning. The limitation of the current research is explained, and at the end of this chapter, suggestions for further research followed by a summary are presented.

This study sought to assess the relationship between motivation and completion of MOOCs in Saudi Arabia. Gender was one of the important variables as well were some of the other demographic variables. A total of 238 MOOCs Saudi learners were included as participants to collect quantitative data via an electronic survey. The following sections discuss each question's findings and their connection to the previous literature.

Research Question 1

What is the relationship between gender and completion of MOOCs?

The first research question assessed the relationship between gender and completion of MOOCs. To answer this question accurately, chi-square test of independence as well as a logistic regression were conducted. According to the findings, there was no significant relationship between gender and completion of MOOCs in Saudi Arabia. Moreover, males and females showed no difference regarding their completion of MOOCs. Meinel, Willems, Renz and Staubitz, (2014) found no significant difference between males and females regarding their completion. However, Ihsen, Jeanrenaud, De Vries, and Hennis (2013) went further than finding a significant relationship between gender and completion. They showed that females were slightly lower than males regarding their completion rate. Rayyan, Seaton, Belcher, Pritchard and Chuang (2013) also found that males were better than females in terms of their retention rate. Although the current results seem to be inconsistent with what was found in some literature (Ihsen et al., 2013 & Rayyan et al., 2013), the setting, which is Saudi Arabia, of the current study was different. Due to the unique education system (single six education) that has been adopted by the Saudi Arabian government (Alrashidi & Phan, 2015), males and females might find MOOCs an attractive environment that creates opportunities to explore new topics and learn from each other. The researcher suggests conducting

further study on the relationship between learners' gender and completion of Saudi MOOCs by taking the education system type into account.

Research Question 2

What is the relationship between gender and motivation (ARCS)?

The second question assessed the relationship between gender and motivation. Independent sample *t*-tests as well as multiple regressions were used to answer the question. There was a significant relationship between gender and motivation. Females' motivational level was higher than males'. These findings were consistent with what has been found in previous studies such as Lim (2004). Lim found a significant difference between males and females in that females were more highly motivated than males. Lim pointed out the females are better in terms of controlling the content, sequence, learning pace, and instructional display. Furthermore Zhao and Mei (2016) found females were significantly higher than males in motivation regarding their emotion and control, which supports some of Lim's findings as well. The current findings were not surprising because of the characteristics of Saudi Arabia learners, as mentioned above. For example, at the time of the study, women were not allowed to drive, which may have prevented them from going to school except they could find transportation. Therefore, online environments such as MOOCs are a good choice and attract the females to learn without facing transportation and drive struggles, which may increase their motivation level more than men.

Research Question 3

What is the extent of the relationship between learners' motivation and completion of MOOCs?

The third question assessed the relationship between learners' motivation and completion of MOOCs. Logistic regressions analyses were used to answer this question. The results showed that there is a significant relationship between motivation and completion of MOOCs. These findings are supported by literature such as Huang and Hew (2016) and Xiong et al. (2015). MOOC learners with high motivation levels were significantly more likely to complete MOOCs than learners who had less motivation (Huang & Hew, 2016). In addition, high motivation prevents MOOCs learners from attrition and increases retention (Xiong et al., 2015). The current findings seem to be aligned with the nature of learners. Learners who are motivated are most likely to continue their learning, gain knowledge and master skills. Learners usually do not quit learning unless their motivational level decreases. For

example, learners may drop a course because they do not find a relationship between the content and their future job or goals. Although the findings of the previous question showed that females were more motivated than males, this question's findings reflected that males were better than females regarding their completion rate. This finding aligns with what was found by Ihsen et al. (2013). Although it seems contradictory that females were more motivated than males and simultaneously their completion rate was lower, the characteristics of Saudi Arabia culture might cause this results. For example, females might take MOOCs and be motivated, but they could not complete their MOOCs because of potential cultural reasons in terms of communication with males. Also, males could be motivated lower than females, but because of some cultural factors, they were more committed to complete their MOOCs better than females.

Suggestions for Future Research

Although this study aimed to assess the relationship between motivation and completion of MOOCs and focused on the gender variable, there are some gaps that need to be assessed and investigated in future studies. The following points are some recommended suggestions. These recommendations including the following:

1. This study assessed the relationship between motivation and completion in Saudi MOOCs through the four ARCS constructs. Therefore, it is recommended to investigate the completion rate relationship with learners' intentions in Saudi Arabia.
2. This study focused on gender more than other demographic variables. Thus, it is essential that future research investigates other demographic variables such as age and marital status and their relationship with learners' motivation and completion of MOOCs.
3. More than half of the participants were from the same platform. Thus, it is important to assess the motivation and completion with a sample that has more variety of MOOC platforms and focuses on the differences between them, which may provide valuable results.
4. The variety of MOOC learners' educational backgrounds as well as the MOOCs' fields can be appropriate areas to investigate because this study did not collect at data from this view.

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