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# Social Media Use and Digital Competence as Predictors of Students' Familiarity with MOOCs

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**Abstract:** Massive Open Online Courses (MOOCs) have been disruptive advancements in online learning and teaching in the last decade. We argue that discourses on the value and limitations of MOOCs have largely taken for granted that students are aware of the existence of MOOCs. In the current research, we examined students' awareness of MOOCs and explored digital competence as a potential predictor of such awareness, hypothesising that the effect may be exerted via social media application use. We deployed a questionnaire (Study 1: N = 152, Study 2: N = 158) to measure students' levels of digital competence, their use of social media applications, and their awareness of MOOCs. We also examined students' motivations for enrolling or not enrolling in MOOCs. The results supported our hypothesis that low digital competence is a predictor of low MOOC awareness, but the results from the mediation analysis were not conclusive.

***Keywords:*** digital competence, higher education, MOOC, MOOC awareness, motivation, self-efficacy, social media, social media use benefits, students



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# Utilisation des médias sociaux et compétence numérique comme facteurs prédictifs de la familiarité des étudiants avec les MOOCs

**Résumé :** Les cours en ligne ouverts et massifs (MOOC) ont constitué une avancée majeure dans l'apprentissage et l'enseignement en ligne au cours de la dernière décennie. Nous avançons l'idée que les discours sur la pertinence et les limites des MOOC ont largement pris pour acquis le fait que les étudiants étaient au courant de l'existence des MOOC. Dans la présente recherche, nous avons examiné la sensibilisation des étudiants aux MOOC et exploré la compétence numérique en tant que prédicteur potentiel de cette sensibilisation, en émettant l'hypothèse que l'effet peut être exercé par l'utilisation d'applications de médias sociaux. Nous avons diffusé un questionnaire (étude 1 N = 152, étude 2 N = 158) pour mesurer les niveaux de compétence numérique des étudiants, leur utilisation des applications de médias sociaux et leur connaissance des MOOC. Nous avons également examiné les motivations des étudiants pour s'inscrire ou non à des MOOC. Les résultats confirment notre hypothèse selon laquelle une faible compétence numérique est un facteur prédictif d'une faible connaissance des MOOC, mais les résultats de l'analyse de médiation ne sont pas concluants.

***Mots-clés :*** compétence numérique, enseignement supérieur, MOOC, connaissance des MOOC, motivation, auto-efficacité, médias sociaux, avantages de l'utilisation des médias sociaux, étudiants

## Introduction

Downes and Siemens introduced Massive Open Online Courses (MOOCs) in 2008 in a course entitled Connectivism and Connectivity Knowledge (Siemens & Downes, 2008), aiming to explore how interactions with online social networks and connectivity can provide a more prosperous learning environment than traditional tools would allow. In the years that followed, researchers (such as Rhoads, 2015) noted that MOOCs could revolutionise higher education and considered them an option to the traditional model of higher education institutions (de Moura et al., 2021). MOOCs hold particular potential for remote or marginalised communities because they can deliver high-quality educational content without the constraints of geographic location or students being able to physically access universities (Mutawa, 2023). However, despite their promise, MOOCs have been plagued by low enrolment and retention rates. Previous research has focused on understanding the motivations of those who enrol and drop out (such as Hone, 2016; Wang et al., 2023), overlooking a significant segment; namely, those who remain unaware or uninformed about MOOCs. This study shifts the focus, aiming to understand the factors contributing to a lack of awareness about MOOCs, emphasising the role of digital competence. Understanding why students do not enrol in MOOCs is crucial in a world where digital learning is becoming increasingly prominent. Although MOOCs have the potential to democratise access to education, their benefits can only be realised if individuals are aware of MOOCs and feel competent to use them. Despite the

importance of this issue, it has received relatively little attention in the literature. The current research measures the level of MOOC awareness among students as a function of digital competence and social media use in a research-intensive public university in the Southern Hemisphere (Study 1) and a university in North Macedonia (Study 2). The choice to focus on digital competence, social media use, and MOOCs was based on key considerations. First, digital competence is becoming increasingly important in education (Zhao et al., 2021), especially with the rise of remote and online learning (Garcia et al., 2021; Kővári & Bak, 2021). Second, the usage of social media, which is a significant part of many students' lives, may be inherently linked to digital competence (Carlisle et al., 2023; Tzafilkou et al., 2022). Lastly, MOOCs represent a digital learning environment that requires a degree of digital competence to navigate and can be promoted or discovered via social media. Therefore, exploring these three areas in conjunction provided us with a unique lens to understand the dynamics between these three variables.

## An Overview of MOOCs and Their Benefits

The philosophy behind MOOCs is that knowledge should be accessible to everyone. Indeed, as *open* implies, MOOCs are free of charge, and participation is unrestricted by location, background, or other factors. The only thing people must have is an internet connection because MOOCs are delivered *online;* there is no face-to-face contact with the instructor. These courses are *massive*

because they are run at scale, without limits to the upper number of students attending, which often reaches thousands (Coffrin et al., 2014). Finally, MOOCs differ from other open educational resources in that they are designed around a *course*, which involves prescribed content, instructions given to students, some form of assessment, and possibly accreditation (Porter, 2015).

The apparent advantages of MOOCs are lack of spatial or temporal constraints, flexibility, and availability in distant and disadvantaged areas where access to traditional courses may be limited (Terras & Ramsay, 2015). The digital nature of MOOCs can provide education access to individuals in remote areas who might not otherwise have learning opportunities; thus, democratising education and bridging the knowledge gap. Moreover, MOOCs can cover a broad spectrum of content, enabling learning in various domains (North et al., 2014). Also, MOOCs can cater to various participants in terms of geographical location, enabling MOOC-takers to be part of a global community of learners (Conole, 2016). Enrolling in MOOCs is an experiential exercise for participants not interested in pursuing further education, giving them a feel for what a degree program may be like (Kerrison et al., 2016), supporting lifelong learning for those not interested in a formal qualification (Sonwalkar & Maheshkar, 2015) or offering professional development opportunities for those in the workforce looking for upskilling (Bakogianni et al., 2020).

## Awareness of MOOCs

Capitalising on the advantages mentioned above requires that individuals enrol in MOOCs. While there has been substantial research on those who decide to undergo such a learning experience, focusing on issues such as the high dropout rate (such as Alraimi et al., 2015; Bezzerra & Silva, 2017; Eriksson et al., 2016; Li et al., 2018; Petronzi & Hadi, 2016) or the motivation for enrolling (Barak et al., 2016; Breslow et al., 2013; Kizilcec & Schneider, 2015; Liu et al., 2014; Watted & Barak, 2018), the question of why participants do not enrol in MOOCs has been neglected. Indeed, there are indications that MOOCs have minimal impact on education access (Lambert, 2020).

While little research explicitly discusses reasons for the non-attendance of MOOCs, potential reasons could be inferred from the literature. For example, the majority of learners enrolled in MOOCs are from countries with high United Nations Human Development Index ratings (Reich & Ruipérez-Valiente, 2019), suggesting that access to the necessary technology and internet infrastructure (Vusumuzi & Mfowabo, 2023), as well as fluency in the language of instruction which is often English (Liyanagunawardena et al., 2013), or cultural differences in learning expectations, could be significant barriers for potential learners from lower-index countries. Further, as lack of time is a frequent reason for dropout (Onah et al., 2014), it could also be a reason for non-enrolment. However, individuals may also be unaware of the existence of MOOCs. We argue that

while an awareness of the existence of MOOCs is necessary, but not sufficient, for engagement with these online learning platforms, a lack of awareness of the existence of MOOCs is the first barrier to potential enrolment.

Although not having access to internet infrastructure or lacking time are barriers to enrolment in MOOC, the lack of awareness of these online learning environments is also a significant concern. Previous and recent research worldwide suggests a universal lack of MOOC awareness, especially among students. For instance, only 22% of undergraduate medical students in Egypt were familiar with the term MOOC (Aboshady et al., 2015). Similarly, 61% of the surveyed students at the Georgian university reported never hearing of a MOOC (Muzafarovaa & Kaya, 2014). In a study conducted in Nepal, students who had not heard of MOOCs reached 78% (Shakya et al., 2016). While some of these studies are relatively *old*, more current research seems to echo the consistent prevalence of lack of awareness about MOOCs (Adebayo & Babalola, 2020). In addition, the number of individuals who have not heard of MOOCs seems similar among professional participants. For example, about 19% of the medical faculty staff surveyed in a study in India were unaware of MOOCs (Dhanani et al., 2016). A study with librarians in Nigeria revealed that 60% were aware of MOOCs (Soyemi & Babalola, 2018), which could be interpreted as a low number in relative terms given that librarians ought to be familiar with digital resources. In a study with Greek teachers, 32% said they knew nothing about MOOCs, and a further 24% said they had heard of MOOCs but did not know what the term

meant (Bakogianni et al., 2020). The low level of awareness, especially in universities in developing countries, is concerning as one of the critical motivations for MOOCs initiatives is to bring high-quality education to the developing world, especially to low-income students in remote areas. Thus, this low awareness is especially concerning.

## Low Digital Competence, Social Media Use, and MOOC Awareness

The set of abilities entailing technology to optimise our daily lives is referred to as digital competence (Zhao et al., 2021). In an increasingly digital era, this competence impacts how individuals interact with digital materials, especially social media. Research shows that higher access to the internet and more positive attitudes towards it, which could be attributes of digitally competent students, are associated with more diverse and frequent internet use (van Deursen & van Dijk, 2019). Indeed, higher digital competence predicts higher informal learning, such as via the internet and social media (Mehrvarz et al., 2021). Thus, students who are more digitally competent should engage with digital material such as social media more often and thereby increase their likelihood of encountering MOOC-related information.

Specifically, studies suggest that digital competence is related to higher informal learning, such as engaging in discussions on social media or watching YouTube videos (He et al., 2021; Heidari et al., 2021). In addition, digital competence predicted online learning engagement during the COVID-19

pandemic (Wang et al., 2021). As students use social media such as Facebook to communicate with their peers (Alwreikat et al., 2021; Selwyn, 2009), collaborate and share resources (Sharma et al., 2016; Toker & Baturay, 2019; Wang et al., 2021), and support their learning (Alenezi, & Brinthaupt, 2022; Chang & Kabilan, 2022; Kabilan et al., 2010), they are more likely to encounter networked information (Halpern & Gibbs, 2013), including MOOC-related information.

Given the rise of social media as information sources (Shearer & Mitchell, 2021), digitally competent individuals stand a greater chance of being exposed to MOOCs, which are often promoted on these platforms. Although the advertisements may not always explicitly use the term "MOOC," they often convey the critical attributes of MOOCs. In addition, MOOC consumers tend to be digitally competent and utilise social networks for learning (Alario-Hoyos et al., 2013; Kasunic et al., 2016; Kop et al., 2011; Liu, Kang et al., 2016; Liu, McKelroy, et al., 2016; Romero-Rodriguez et al., 2020), suggesting that higher digital competence would also lead to higher awareness about MOOCs.

Thus, to be exposed to MOOCs, individuals may need to engage with digital technologies and social media networks, such as experiencing MOOC-related tweets (Costello et al., 2016), blogs (Chen, 2014), or advertisements. If a person is less digitally competent, we could expect them to be less likely to use the internet or social media where MOOC courses are facilitated and talked about, and therefore less likely to encounter the concept of a MOOC.

On the other hand, low digital self-efficacy, a concept closely related to competence, leads to higher anxiety (González et al., 2017), lowering the likelihood of engaging with the task (Bandura, 1982). If individuals do not feel competent to use digital technologies, they would be less likely to use them (Martín et al., 2019). As a result, they would engage with social media less and would be less likely to be exposed to information about different MOOCs.

Based on the above, we hypothesise that digital competence predicts familiarity with MOOCs through use of social media applications. We test this hypothesis with a sample of students (*N* = 152) from a research-intensive public institution in New Zealand (Study 1) and a sample from a non-western country (Study 2: *N* = 158) in a correlational research design.

The aims of this research were three-fold. First, we aimed to explore the extent to which participants were familiar with MOOCs and the enrolment rate in MOOCs out of the participants aware of their existence. Secondly, we tested the hypothesis that individuals who feel competent to use digital technologies will be more likely to use social media applications to support their learning, which will predict higher awareness of MOOCs. Finally, given that research has neglected to inquire about the motivations for not enrolling in MOOCs and students' reasons for registering, we were interested in students' motivations for not enrolling in them. The research was approved by the University of Otago Human Ethics committee (approval D21/358).

# Study 1

## Participants

Participants were 152 students enrolled at the University of Otago (100 female, 50 male, and 1 preferred not to say). Detailed demographics for the participants are presented in Tables 1 to 6.

**Table 1**

*Demographic Characteristics of the Sample — Age*

| Age (Years) | Frequency | Per cent (%) |
|---|---|---|
| <25 | 29 | 19.1 |
| 26–30 | 28 | 18.4 |
| 31–35 | 20 | 13.2 |
| 36–40 | 19 | 12.5 |
| 41–45 | 17 | 11.2 |
| 46–50 | 11 | 7.2 |
| 51–55 | 19 | 12.5 |
| ≥56 | 9 | 5.9 |

**Table 2**

*Demographic Characteristics of the Sample — Location*

| Location | Frequency | Per cent (%) |
|---|---|---|
| Distance student | 71 | 46.7 |
| On-campus student | 52 | 34.2 |
| Missing values | 29 | 19.1 |

**Table 3**

*Demographic Characteristics of the Sample — Academic Division*

| Academic division | Frequency | Per cent (%) |
|---|---|---|
| Humanities | 35 | 23.0 |
| Health Sciences | 71 | 46.7 |
| Commerce | 19 | 12.5 |
| Science | 26 | 17.1 |
| Missing values | 1 | 0.6 |

**Table 4**

Demographic Characteristics of the Sample — Type of Enrolment

| Type of enrolment | Frequency | Per cent (%) |
|---|---|---|
| Part-time | 73 | 48 |
| Full-time | 79 | 52 |

**Table 5**

*Demographic Characteristics of the Sample — Gender*

| Gender | Frequency | Per cent (%) |
|---|---|---|
| Male | 51 | 33.6 |
| Female | 100 | 65.8 |
| Prefer not to say | 1 | 0.06 |

**Table 6**

*Demographic Characteristics of the Sample — Education Level*

| Highest level of education achieved | Frequency | Per cent (%) |
|---|---|---|
| PhD | 9 | 5.9 |
| Master | 60 | 39.5 |
| Bachelor | 56 | 36.8 |
| Diploma | 5 | 3.3 |
| Other | 22 | 14.5 |

## Procedure and Measures

We initially used data collected in 2018 and 2019 as part of a more extensive unrelated research programme exploring different learning spaces. Thus, for Study 1, we used a pre-collected dataset. The survey was an online questionnaire that contained questions about social media use for learning, digital competence, and familiarity with and participation in MOOCs, among other questions. (Note that the other questions are not about subjects of interest in the current study and will not be reported here.) The larger survey link was sent to all students enrolled at the university and remained open for several weeks. There was no incentive offered for participation.

### *Digital Competence*

To measure digital competence, participants were asked to rate their agreement or disagreement with the following statement: "I am competent using digital technologies for learning." They rated the statement using a 5-point scale,

anchored at 1 = strongly disagree and 5 = strongly agree. They were also asked to explain their answer briefly.

### *Social Media Applications Use*

Participants were presented with a list of 11 social media applications (Facebook, Twitter, Instagram, Pinterest, Google+, Tumblr, Vine, VK, LinkedIn, Flickr, and YouTube) and an additional option for "Other" with a text box for participants to input their answers. They were asked to indicate which social media applications they use to support their learning. They were also asked to "briefly provide specific purposes for using social media for educational activities." The number of social media applications used was derived by adding the number of applications participants use (except "Other") and the number of additional applications they entered under "Other." The total represented the *social media application use index*.

### *Familiarity with a MOOC*

Familiarity with MOOCs was measured by asking participants, "Do you know what a Massive Open Online Course (MOOC) is?" There were two response options: no (coded as 0) and yes (coded as 1). If participants answered yes, they were instructed to "briefly describe what a MOOC is" to provide examples.

### *Participation in MOOC*

Finally, participation in MOOC was measured with the following question, "Have you participated in a Massive Open Online Course (MOOC)?" The response

options were again: no (coded as 0) and yes (coded as 1). Participants were further instructed to state their motivation for learning through a MOOC or why they chose not to enrol.

Demographic variables such as gender, age, division, full-time/part-time status, and distance student/on-campus student status were also measured.

## Results

### *Descriptive Statistics*

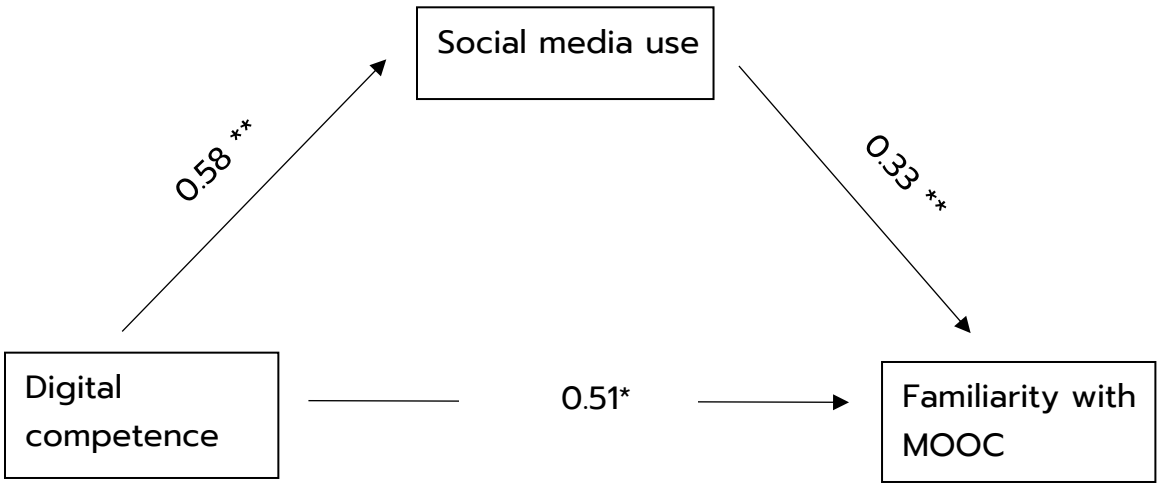
As shown in Table 7, only 26% of participants reported knowing what a MOOC is. Further analysis indicated that 64% of the individuals who knew what a MOOC is had participated in one.

**Table 7**

*Correlation Coefficients between the Variables of Interest and Descriptive Statistics*

| | Social media use | Digital competence | MOOC familiarity |
|---|---|---|---|
| **Social media use** | 1.70 (1.62) | | |
| **Digital competence** | .30** | 4.20 (0.82) | |
| **MOOC familiarity** | .29** | .21* | 0.26 (0.44) |

*Note*. **p<0.001, *p<0.05. Numbers on the diagonal represent M(SD). "Do you know what a MOOC is?" was coded: 0 = no; 1 = yes. Thus, the mean represents the proportion of participants who responded affirmatively.




*Note*. **p<0.01, *p<0.05, ˙p<0.1

**Figure 1:** Path Analysis from Digital Competence to Familiarity with MOOC via Social Media Use. Image description available.

***Mediation Analysis***

We ran Process Model 4 (Hayes, 2013) to test our central hypothesis, with digital competence as an independent variable, social media use as a mediator, and familiarity with MOOCs as a dependent variable. The results are presented in Figure 1. The direct effect was marginally significant; however, the indirect effect was 0.19, 95% CI [0.05, 0.41], and the 95% CI did not cross 0, suggesting the impact of digital competence on MOOC awareness was exerted via social media use. This lent support to our hypothesis that individuals who are more digitally competent are likely to engage with various forms of social media applications to support their learning. This, in turn, may lead to higher chances

of individuals familiarising themselves with MOOCs and, thus, higher MOOC awareness.

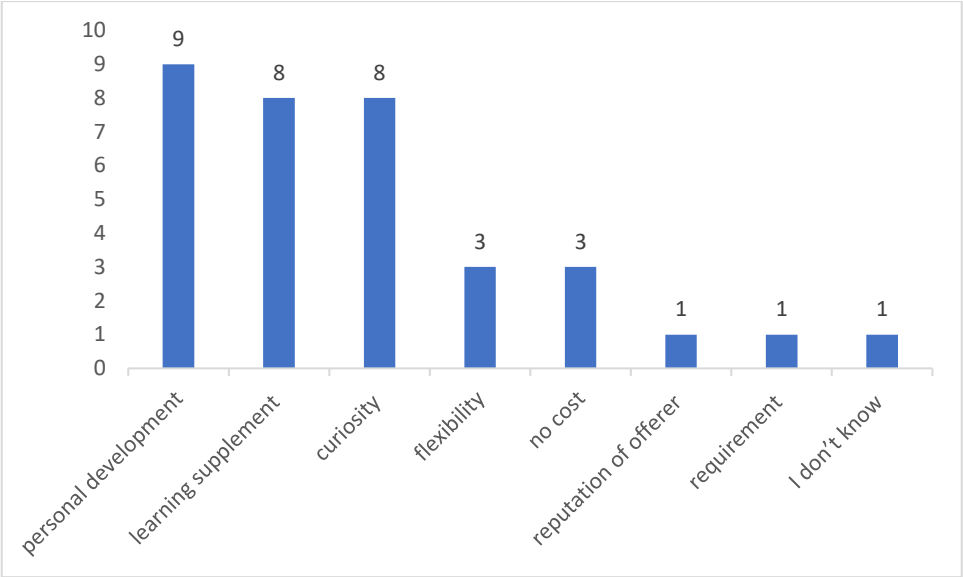



**Figure 2:** Motivations for Enrolling in a MOOC. *Image description available*.

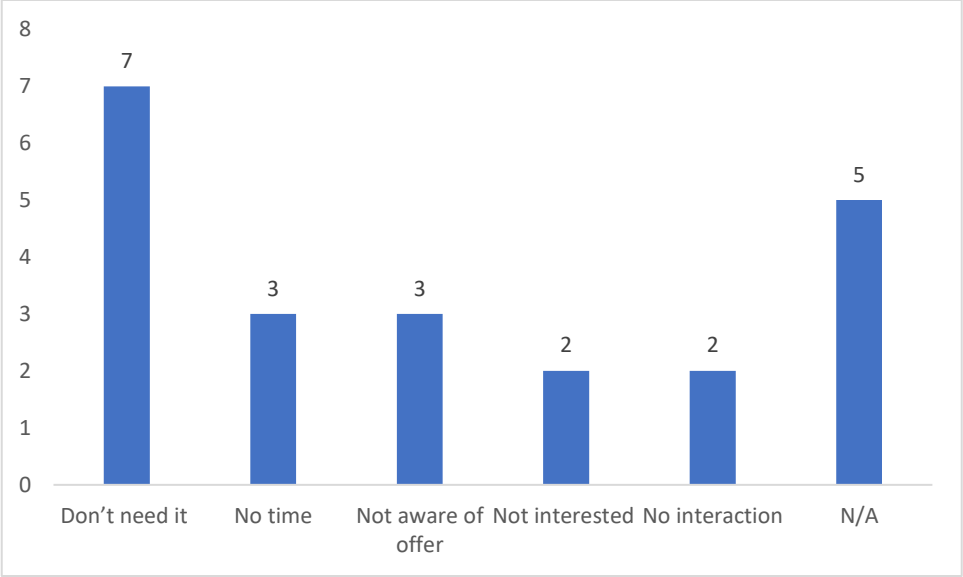
### *Motivation for Participating/Not Participating in a MOOC*

We next looked at participants' reported motivation for participating or not participating in a MOOC. The first author devised the categories and classified the responses.

The reasons for participating in a MOOC are summarised in Figure 2. (Please note that although only 28 participants provided answers, the numbers add up to a more significant number because some participants mentioned multiple motivations). As can be seen in Figure 2, the most frequently reported reason for using MOOCs is for upskilling and personal development, followed by

using MOOCs as a learning supplement, and out of curiosity and interest. Some less frequently reported reasons were the flexible participation a MOOC offers and the absence of associated costs. One participant was motivated by the reputation of the offeror, one because it was a requirement, and one reported that they did not have an insight into their motivation.

Looking at the reasons for not attending a MOOC, 89 participants answered the open-ended question. Of these, most (*f* = 67) stated they did not know about MOOCs. The rest of the results are depicted in Figure 3. Seven participants said they had not enrolled in a MOOC because it was unnecessary for their studies. Three participants gave lack of time as a reason, and just as many stated, they are unaware of the content on offer (for example, "Mainly I haven't enrolled because I'm not very aware of them, and whether I would enrol would depend on the quality."). Two participants stated they were not interested in the offered content (for example, "Doesn't necessarily fit my personal learning or development needs."). Two participants reported that they did not enrol because the MOOCs did not provide the learning environment they needed. (for example, "i [sic] think the dis*cussion and interaction aspects would be lost*.").




*Note.* For visibility purposes, this graph does not depict the 67 participants who reported they do not know what MOOCs are.

**Figure 3:** Motivations for Not Enrolling in a MOOC. Image description available.

## Study 2

Study 1 initially supported the hypothesis, but we acknowledge several limitations. The operationalisation of the variables, such as digital competence and MOOC familiarity, was based on a single item measure, potentially introducing a measurement error. In addition, social media use did not consider the time spent using applications, but only their number which may not reflect the intensity of engagement.

To address these concerns, we conducted Study 2 to refine our measurements and test the generalisability of the results. We selected students

from a university in North Macedonia to diversify the sample and thereby increase the robustness of our findings.

In Study 2, we directly incorporated insights from Study 1, using multi-item scales to improve the measurement of digital competence and MOOC familiarity. Likewise, we enhanced the measurement of social media use by considering the number of applications used and the time spent on each application, thereby obtaining a more precise picture of students' engagement.

Despite the different contexts and refinement in measurement, we could draw more robust conclusions if similar patterns were observed across the studies.

## Participants

One hundred and fifty-nine full-time psychology students who were enrolled at a university in North Macedonia (18 males, 140 females, 1 other) completed an online questionnaire as volunteers. The mean age was 20.42 years (*SD* = 2.40, range 18-34).

## Procedure

We sent the participants a Qualtrics survey link via email, informing them about the opportunity to participate in a research study. Those who clicked on the link were taken to the survey, where they read the information sheet and provided informed consent before answering questions about digital

competence, social media application use, MOOC, and their demographics, always in that order.

## Measures

All measures were presented in Macedonian. The first author translated the items and discussed the translation with the third author, both native Macedonian and fluent English speakers. Amendments were made where appropriate to more closely capture the meaning of the items in a way that sounds natural in Macedonian.

Digital competence was measured with Wang et al.'s (2021) scale. Participants rated their agreement with ten items. Six of the items measured digital skills, such as with this statement: "I am confident with my capability of applying digital technologies to increase my learning effectiveness and efficiency." Four of the items measured technical literacy, such as with this statement: "I have an informed and balanced attitude towards digital technologies, fully aware of their potential benefits and risks." The measurements were taken on a 5-point Likert type scale anchored at 1 = strongly disagree and 5 = strongly agree. Cronbach alpha = 0.77.

Time spent on social media was measured by asking participants to indicate which social media apps they use (same question as in Study 1). They were also asked to enter the average number of minutes spent daily in the last

three months using each of the social media applications they indicated they use and to calculate the sum of the minutes.

MOOC awareness was measured with the following six items:

- "I know what MOOC stands for."
- "I have heard about massive open online courses."
- "I know what massive open online courses are."
- "I could confidently explain what a massive open online course is."
- "I have never heard about a massive open online course" (reverse coded).
- "I have a faint idea what a massive open online course is" (reverse coded).

Participants rated their responses to the above statements on a 5–point scale (1 = strongly disagree; 5 = strongly agree). Cronbach alpha = 0.79.

Finally, participants were asked if they had ever participated in a MOOC and their motivation for participating or not participating.

## Results

### *Descriptive Analysis*

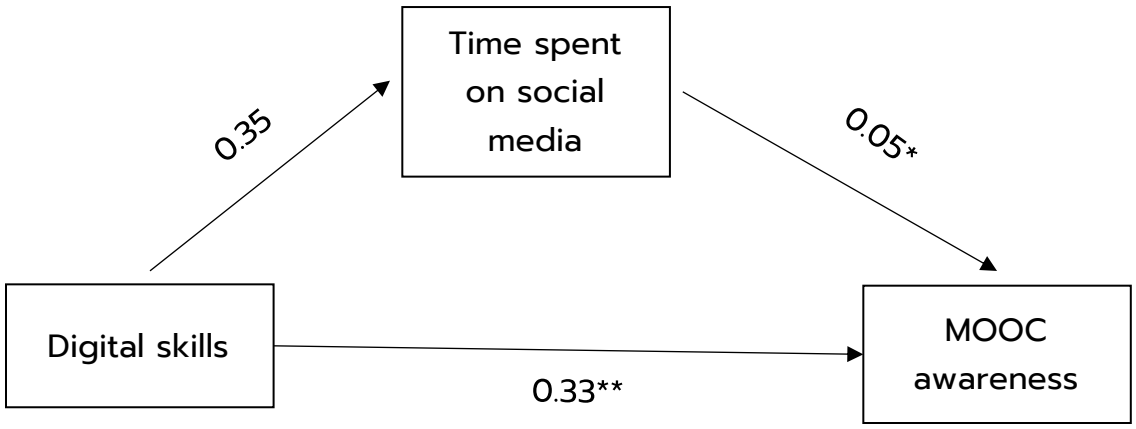
The means, standard deviations, and correlation coefficients among the examined variables are given in Table 8.

**Table 8**

*Descriptive Statistics and Correlation Coefficients among MOOC Familiarity, Digital Competence, and Social Media Use*

| | M | SD | DC total | DS | TL | Time spent | MOOC familiarity | Number of apps |
|---|---|---|---|---|---|---|---|---|
| **DC total** | 3.67 | 0.53 | | | | | | |
| **DS** | 3.60 | 0.65 | 0.93** | | | | | |
| **TL** | 3.79 | 0.58 | 0.75** | 0.42** | | | | |
| **Time (hrs)** | 3.60 | 3.21 | 0.06 | 0.14 | -0.11 | | | |
| **MOOC familiarity** | 2.93 | 0.82 | 0.22** | 0.20* | *0.17 | 0.23** | | |
| **Number of apps** | 2.90 | 1.30 | 0.09 | 0.13 | -0.01 | 0.43** | 0.23** | |
| **MOOC attendance** | 0.18 | - | 0.20* | 0.22** | 0.1 | 0.04 | 0.45** | 0.20* |

*Note.* *p<0.05, **p<0.01. MOOC attendance was coded 0 = no; 1 = yes, thus representing the per cent of participants who responded "yes." M = mean; SD = standard deviation; DC total = digital competence total score; DS = digital skills; TL = technical literacy




*Note.* *p<0.05, **p<0.01

**Figure 4:** Mediation Analysis with Digital Skills as the Predictor, MOOC Awareness as the Outcome and Time Spent on Social Media as a Mediator.

Image description available.

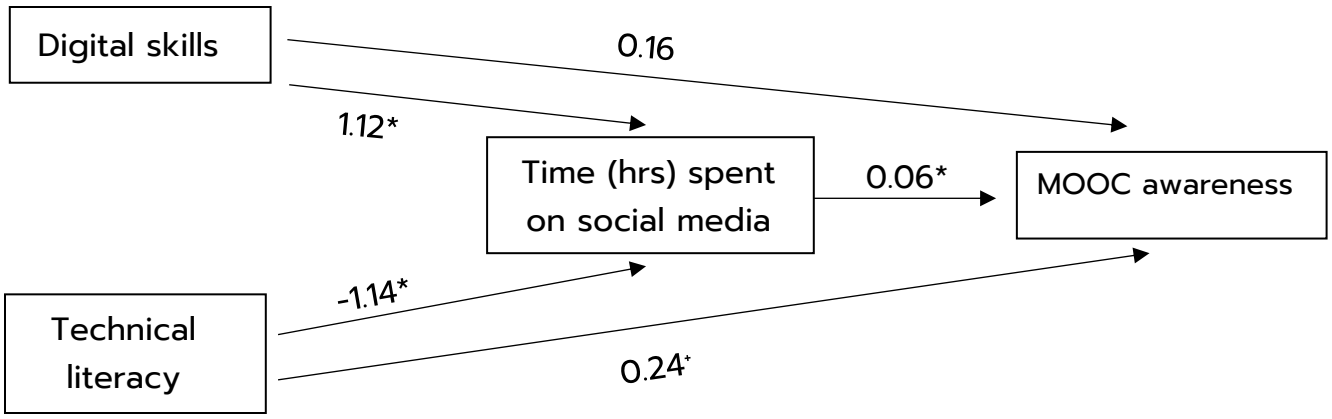
### *Mediation Analysis*

To test the mediation hypothesis, we used PROCESS Model 4 (Hayes, 2013). As shown in Figure 4, digital competence predicted MOOC awareness. However, the 95% CI for the indirect effect crossed zero [-0.0287, 0.1009], suggesting no mediating effect. To probe the findings more deeply, we used the lavaan package (R Core Team, 2020; Rosseel, 2012) in R and ran a path analysis with each subcomponent of digital competence as a separate predictor (see Figure 5). Results of the indirect effects (see Table 9) suggested that the mediation effects were only marginally significant. Also, in the opposite direction: while digital skills predicted increased time spent on social media, technical literacy predicted decreased time spent on social media. This suggests that different aspects of digital competence have distinct effects on social media use, which may eventually cancel each other, as indicated by the total indirect effect.

**Table 9**

*Indirect Effects from Digital Competence to MOOC Awareness via Social Media Use*

| | Estimate | SE | Z | p |
|---|---|---|---|---|
| TL → time on social media → MOOC awareness | -0.070 | 0.042 | -1.697 | 0.09 |
| DS → time on social media → MOOC awareness | 0.069 | 0.038 | 1.816 | 0.07 |
| Total indirect effect | -0.001 | 0.032 | -0.030 | 0.97 |




*Note*. *p<0.05, **p<0.01, +p<0.1

**Figure 5:** Path Analysis from Digital Skills and Technical Literacy to MOOC Awareness via Social Media Use. Image description available.

### *Qualitative Analysis*

The coding procedure was as described in Study 1.

Most of those who disclosed their motivation for attending MOOC reported support of learning or enrichment of knowledge as the primary reason. Four participants reported interest as the primary motivation (for example, "*Interest in the topic*."). One participant believed they would have more employment opportunities.

Regarding reasons for not attending MOOCs, unawareness was the primary factor (*f* = 59), followed by lack of interest (*f* = 21), lack of time (*f* = 8), lack of opportunity (*f* = 6), or difficulties in learning from screen (*f* = 5). Twelve participants gave idiosyncratic answers such as, "*Anxiety in case I need to introduce myself in front of others*", "*For private reasons*", or "*Experience*".

## Discussion

MOOCs can offer accessible and affordable learning opportunities to students globally. To summarise, most of the critical prevalent research into MOOC focuses on low completion rates, prompting inquiries into student engagement and retention strategies (Khalil & Ebner, 2014). Other studies have also looked into the nature of MOOC pedagogy, encompassing teaching methods such as video lectures and peer assessments (Yousef & Sumner, 2021). Furthermore, with MOOCs accommodating vast numbers of students, challenges arise in creating scalable assessment methods, understanding participant demographics, and ensuring accessibility. Equally important is the financial sustainability of these often-free courses and the formation and nurturing of online communities within them.

Given the diverse MOOC audience, issues of personalisation of content remain a key focus, alongside pressing ethical concerns about participant data privacy. Recently, there has been a movement towards understanding the impact of various digital platforms and tools (such as augmented reality or virtual reality and artificial intelligence) on MOOCs (King & Lee, 2022). Additionally, given their global outreach, there is a growing interest in the cross-cultural dimensions of MOOCs. As online education's landscape continuously shifts, these research areas will likely evolve, paving the way for new inquiries.

Despite this potential, the awareness of MOOCs remains relatively low among students worldwide. In our research, only 25% of the surveyed students were aware of MOOCs in Study 1, and about 10% agreed or strongly agreed with the items that measured MOOC awareness in Study 2. According to the founding ethos of MOOCs, engagement with social media applications such as social networks and connectivity constitute the fundamental conduit for knowledge creation, and the current results seem to support that broadly. We hypothesised and found support for the idea that low digital competence predicts lower MOOC awareness. However, the findings of the possible mechanism via lower engagement with social media applications were inconclusive. Study 1 supported the proposed mediation hypothesis, but the results in Study 2 did not reach statistical significance. In addition, it seems like the effect of digital competence on MOOC awareness via social media applications is multifaceted and different subcomponents of the digital competence construct may exert an opposite effect on social media use.

The counter-intuitive finding that technical literacy negatively predicts social media use may be attributed to several factors. The items in this subscale tapped into being aware of and understanding ethical and legal issues related to digital technology use, staying up-to-date on technology developments, and making informed choices about which digital technologies are most relevant to one's learning. Thus, individuals with high technical literacy might be more mindful of ethical and legal issues related to digital technologies, making them

more wary of the data privacy and security issues commonly associated with social media platforms (Jozani et al., 2020). Similarly, they might perceive social media as a less reliable source of information, given its common association with circulating misinformation (Freiling et al., 2023; Wang et al., 2019). Finally, they may not regard social media as the most effective tool for learning, because social media is more usually associated with informal learning and communication rather than purposeful educational engagements (Kumar & Gruzd, 2023).

We also examined students' motivations for enrolling or not enrolling in a MOOC. Regarding motivation for enrolling in MOOCs, previous research has shown that interest in the topic and desire to increase knowledge in a particular area (Breslow et al., 2013; Liu et al., 2014) are potent motivators. Personal growth such as facing a challenge (Breslow et al., 2013; Kizilcec & Schneider, 2015), or intrinsic motivation (Barak et al., 2016) such as curiosity (Hew & Cheung, 2014), have also been found to motivate enrolment in MOOCs. Other reasons for enrolling in MOOCs include social motives such as meeting new people or participating in a course offered by a prestigious institution (Kizilcec & Schneider, 2015), or extrinsic motivation such as a requirement for work (Shapiro et al., 2017) or gaining a certificate (Watted & Barak, 2018) for professional development purposes (Fini, 2009). The reported motivation for enrolling in MOOCs was broadly consistent with these previous studies (such as Moore &

Wang, 2021; Semenova, 2020), and we did not uncover a motivation that has not been reported so far.

The diverse motivations reported in this study and elsewhere suggest that some of the reasons contributing to low retention (Chen & Zhang, 2017; Henderikx et al., 2017; Rodriguez, 2012; Xing et al., 2016) in MOOCs are not because MOOCs are ineffective learning environments, but simply because different learners enrol or are motivated to enrol for various reasons. Many learners may never intend to complete a MOOC, but instead want to gain a fragment of experience in a subject before enrolling on a degree programme. Even teachers may explore a MOOC without intending to complete it in order to see how they can develop their courses. However, the current research uncovered reasons for not enrolling in MOOCs. The major reason is low to inexistent awareness about the presence of MOOCs or the content they offer, suggesting that greater MOOC exposure and targeted marketing are needed.

Beyond lack of awareness that MOOCs exist, the other reported motivations might provide insight into developing these courses to make them more attractive to a broader audience. One frequently stated motivation was that MOOCs are not *required* for the participants' studies. Future MOOCs could offer the possibility of developing more specialised and in-depth content beyond what is provided in traditional university classes and could be used to supplement university learning that the lecturers would recommend. Indeed, some micro-credentials seem to be already filling this gap. This approach

deviates from most offerings in universities, where MOOCs are mostly targeted at students outside the institutions in which MOOCs are delivered.

The present study aligns with the hypothesis that lower digital competence and limited engagement with social media lead to reduced awareness of MOOCs. Prior studies have shown that digital competencies are linked to MOOC dropout rates (Castaño-Muñoz et al., 2016; Romero-Rodríguez et al., 2020). A lack of digital interaction means fewer chances for potential students to encounter MOOCs as self-directed learning environments. Thus, it is suggested that amplifying digital competence and integrating social media could enhance MOOC awareness. But awareness does not necessarily convert to engagement. Beyond digital competency, factors like motivation play a significant role in enrolment (Moore & Wang, 2021). As MOOC course design evolves, there is a call for innovation to captivate a broader audience, evidenced by emerging gamified elements in MOOCs (Aparicio et al., 2019).

However, irrespective of design and promotional efforts, MOOCs might not replace traditional university courses. They are often viewed as complementary to formal education, as demonstrated by students' perceptions of MOOCs supplementing traditional courses (Kundu & Bej, 2020). This supplementary perspective might explain the high dropout rates, like the steep drop seen in Peking University's MOOC on Coursera (Chen & Zhang, 2017). MOOCs are often free, which could result in reduced student commitment, and the plethora of course choices might be overwhelming. The inherent

asynchronous nature of delivering MOOC programmes can also reduce real-time interaction, possibly causing feelings of isolation among some students. Although inclusive, the open-access model of MOOCs presents a challenge because students from varied backgrounds may find the content either too basic or too advanced, or culturally inappropriate or irrelevant. The lack of formal accreditation, distractions from external commitments, technical hindrances, and vast options compound these challenges.

Notably, the observed high dropout rates in MOOCs are consistent across different platforms. For instance, there was a significant drop in completion rates for the CCK08 course by Siemens and Downes (as cited in Rodriguez, 2012), with some courses having dropout rates as high as 98% (Henderikx et al., 2017). Often used as additional resources, MOOCs seem to be treated more casually, akin to watching a documentary rather than committing to a formal educational track.

Indeed, as our participants reported, MOOCs are used as supplementary resources during university, and the high number of participants who merely *lurk* in these courses reported elsewhere suggests that MOOCs are approached in a more laid-back manner, rather than as an externally imposed requirement which is seen as a means to an end.

## Limitations and Conclusions

The study is not without limitations. Most obviously, digital competence is a complex concept that encompasses knowledge, skills, attitudes, and strategies when digital media are used to perform tasks (López-Meneses et al., 2020), so it is not clear which of these subcomponents or their combination may be driving the effect. Given that in Study 1 we relied on data previously collected for other purposes, we were limited by the operationalisation of the digital competence construct, which was measured with only one item, leaving a greater possibility for measurement error and imprecise measurement. The sample sizes in Study 1 and Study 2 were relatively small, albeit not very different from the median sample size in mediation analysis studies (Fritz & Mackinnon, 2007). Further, we relied on convenience sampling, meaning the results may not represent the wider student community. Nevertheless, given that MOOC familiarity was similar to what is reported in other studies, we believe our sample is not unique or different in a way that would have influenced the results.

Further, only a subset of participants elaborated on their use of social media for educational activities, so the frequency of motivations was relatively small. Finally, the scope of our study was somewhat limited in that we focused on unawareness as a possible reason for non-attendance. However, as noted before, this is just one reason, and other factors likely lead potential students to pass these learning opportunities. These reasons can extend beyond the scope

of our research, including factors like time constraints, the perceived quality or relevance of MOOC content, lack of access to appropriate technology, or preference for face-to-face learning environments. It is essential to consider these broader factors in future research. However, our study explicitly addresses one aspect of this complex issue that is often overlooked in the literature: the impact of digital competency on awareness of MOOCs. Thus, our findings should not be viewed as the sole or most significant explanation for non-participation in MOOCs, but rather as a component of a multifaceted issue. It is at the intersection of many factors, including the ones we have explored in this study, where we can begin to understand the bigger picture. Future research should adopt a more comprehensive approach to identify other barriers to MOOC participation.

Despite these limitations, the current study is one of the first to explore the discourse about MOOCs, shifting the focus from finding out more about those who enrol in MOOCs to finding out more about individuals who are *not* enrolling in MOOCs and are unaware MOOCs exist. Our work adds to the growing body of literature calling for exploring students' unawareness of MOOCs and whether or not this constitutes the first barrier to enrolment; this research underscores the need for improved digital competence. This step is crucial in overcoming this obstacle, bringing students closer to the promise of MOOCs in providing education for all.

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## Image Descriptions

**Figure 1 image description:** A diagram shows the path analysis of the following:

- Digital competence with an arrow pointing to social media use and familiarity with MOOC
- Social media use with an arrow pointing to Familiarity with MOOC

[Back to Figure 1]

**Figure 2 image description:** A bar graph shows number of participants for each reason for enrolling in a MOOC:

- Personal development: 9
- Learning supplement: 8
- Curiosity: 8
- Flexibility: 3
- No cost: 3
- Reputation of offeror: 1
- Requirement: 1
- I don't know: 1

[Back to Figure 2]

**Figure 3 image description:** A bar graph shows number of participants who indicated the following sources of motivation for not enrolling in a MOOC:

- Don't need it: 7
- No time: 3
- Unawareness of offer: 3
- Not interested: 2
- No interaction: 2
- N/A: 5

[Back to Figure 3]

**Figure 4 image description:** A diagram shows the path analysis of the following:

- Digital skills with an arrow pointing to time spent on social media use and MOOC awareness
- Time spent on social media with an arrow pointing to MOOC awareness
- MOOC awareness

[Back to Figure 4]

**Figure 5 image description:** A diagram shows the path analysis of the following:

- Digital skills with an arrow pointing to MOOC awareness and social media use
- Technical literacy with an arrow pointing to MOOC awareness and social media use
- MOOC awareness
- Social media use with an arrow pointing to MOOC awareness

[Back to Figure 5]