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Undergraduate Students' Experiences of the Use of MOOCs for Learning at a Cambodian University

Riccardo Corrado [1,2,3,*], Erica Pretorius [3] and Gert van der Westhuizen [3]

[1] Department of Information and Communications Technology, American University of Phnom Penh, Phnom Penh 12106, Cambodia
[2] Cambodian Ministry of Post and Telecommunications, Phnom Penh 12200, Cambodia
[3] Faculty of Education, University of Johannesburg, Johannesburg 2006, South Africa; ericap@uj.ac.za (E.P.); gertvdw@uj.ac.za (G.v.d.W.)
* Correspondence: r.corrado@aupp.edu.kh

Abstract: Currently, some universities in Cambodia are exploring the usage of Massive Open Online Courses (MOOCs), which can support education by allowing cost-free independent learning for university students. For effective implementation, it is fundamental to understand the current Cambodian ecosystem, how universities implement MOOCs for teaching, and how students use them for learning. Due to a current gap in the literature on this matter, this research work aims to investigate students' awareness of MOOCs, usage, and difficulties encountered with their adoption for learning. This research work is a case study of a university in Cambodia, and it adopts a mixed-mode approach involving a quantitative questionnaire, followed by qualitative semi-structured interviews. Currently, many students are not aware of MOOCs, and regarding those using them, they report a low level of organized effort, which points out to the fact that students are in general not very organized and systematic in the way they approach learning using MOOCs. Furthermore, a major issue still lies in the way these courses are implemented in the curriculum and the learning activities, underlined by the type of ICTs affordances currently exploited by the usage of MOOCs for learning.

Keywords: Cambodia; higher education; MOOCs; awareness; ICTs affordances; approach to learning; online teaching

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1. Introduction

Information Communication Technologies (ICTs) are at the core of the disruptive changes that all the world is experiencing at every level of our lives in Covid times, and it is important to understand what they can offer to education, mostly for developing countries like Cambodia. Regarding Cambodia, in fact, its education sector has expressed a rising interest in the offering of technologies applied to education. Specifically, regarding technologies at the service of education, William Cope and Mary Kalantzis introduced in their eLearning Ecology course offered on the Coursera platform, which is an interesting and insightful concept of e-affordance. In accordance with them, ICTs offer instructional designers the chance to enable new learning opportunities, while providing tools for differentiating and improving the assessment process, both formative and summative. Cope and Kalantzis [1] defined seven affordances that ICTs offer, namely ubiquitous learning, active knowledge-making, multimodal meaning, recursive feedback, collaborative intelligence, metacognition, and differentiated learning.

The first ICT affordance defined by Cope and Kalantzis [1] is ubiquitous learning. This affordance refers to the ability to learn, breaking the barriers of distance, space, and time. Learning from anywhere with an electronic device, like a tablet, laptop, or smartphone, and an Internet connection has become a normality in several learning ecosystems around the world. Regarding ubiquitous learning, Kinshuk & Graf [2] wrote that "such

ubiquitous approach to learning requires modelling of a variety of personal and environmental parameters." The second affordance offered by ICTs is active knowledge-making, which emphasizes innovation, creativity, and problem solving as fundamental elements for learning. In accordance with Cope and Kalantzis [1], and in alignment with the intrinsic motivational theories, active engagement with the areas a learner is interested in represents a fundamental element for supporting and fostering learning.

The third affordance associated with ICTs is multimodal learning. Regarding this, following Cope and Kalantzis [1] and in accordance with an interpretivist approach based on constructionism, there is not a unique reality when we talk about learners. Hence, classes and learning activities should be designed in accordance with the different modality of learning: written language, oral language, image, sound, gestures, and tactile. The learning design of activities itself must consider every modality of learning and create an experience that can be various and, thus, effective for every kind of learner [3]. The fourth affordance of ICTs is recursive feedback. As remarked by Cope and Kalantzis [1], assessment is essential in learning, and ICTs allow learners to constantly receive small recursive feedback that empowers their learning process [4], and creates a grey area between learning and assessing, an area where everything becomes a continuous formative assessment with learning as a goal. Additionally, ICTs offer the chance to educators to implement flip learning in the learning activity [5], sending through emails or SMS the link of a video that students can watch before the lesson. Thus, class time can transform into discussion time.

Furthermore, another affordance offered by ICT in education is represented by collaborative intelligence, listed as the fifth affordance of ICT in education by Cope and Kalantzis [1]. Collaboration represents one of the seven principles of learning defined by OECD: "social nature of learning." Neuroscience confirms that students learn through social interaction and highlights the importance of learning as an activity that should be highly social [6]; "Co-operative group work, appropriately organized and structured, has demonstrated very clear benefits for achievement as well as for behavioral and effective outcomes" [6]. ICTs allow for and enhance collaboration between students [7], offering project management platforms, blogs, file-sharing services, video chat services, and almost everything someone can imagine for free. The sixth affordance is metacognition, which is referred to as thinking about thinking. Metacognition helps to reflect on what learners know, what they have understood, and where they are going. Blogs, websites, online documents, and journals can easily be supported by ICT tools and enhance the process of maintaining, organizing, and sharing thoughts, opinion, difficulties, doubts, and, in general, ideas with others, transforming a vertical approach to education to a horizontal approach, where collaboration becomes a way to support metacognition [8]. Finally, the seventh and last affordance is differentiated learning, which focuses on offering different and tailored learning activities based on the individual learners, who can be offered designed activities ad-hoc, based on their background, knowledge, and general cultural background [1]. The concept of student at the center emerges again, and ICTs empower learning designers with the ability to better craft learning activities that are tailored to the single student, following theorists like John Dewey, Jean Piglet, Lev Vigotsky, and Maria Montessori, whose work focused and supported a student-centered approach in learning designing.

Considering the many affordances offered by ICT and defined by Cope and Kalantzis [1], one of the many tools offered by ICTs applied to education is represented by Massive Online Open Courses. Differently from open or distance learning, Massive Online Open Courses, of which acronym MOOCs comes from multi-player online game (MMOG) [9], are a relatively new learning phenomenon that provides a combination of eLearning and open education [10]. In 1995, at Penn State University in the United States, Mr. Jerrold Maddox taught the first course delivered over distance on the web called "Commentary on Art." Only four years later, the term "eLearning" was coined. In 2013, for the first time, the UK government made available loans for students enrolled in distance learning undergraduate programs. There is a difference between eLearning and MOOCs. eLearning can be defined as the use of

electronic tools and digital media to support learning activities, or to even replace entirely the in-class learning experiences with full-online learning [11]. MOOC is a course available online, with free registration and open access, where students can watch recorded videos, or even participate in asynchronous learning activities, following a well-defined syllabus with specific learning outcomes. The fundamental concept underpinning MOOCs is self-organization and freedom in choosing to participate to them in accordance to self-interests, as well as the self-assessed readiness of prior knowledge and skills [12].

With the growth in popularity of these MOOCs, many schools and universities have seen the opportunity to use them and implement them in their curriculum. However, MOOCs by themselves can only provide little support to a student's learning experience if the implementation is not guided by clear guidelines. The implementation of MOOCs needs to consider important factors such as seeking funding, promoting the course, legal issues, scaffolding, connection between learners, and alignment with learning outcomes [13]. Specifically, Sigama and Kalema [13] have identified some theoretical fields that underpin an effective implementation of MOOCs: unifying the fragmented model of information systems implementation (individual factors and task-related factors), technology organization environment (organizational, technological, and environmental factors), diffusion of innovation (trialability, relative advantage, and observability), and eLearning pedagogies (open learning, learning communities, and distributed learning).

Focusing on the Cambodian case, in rural Cambodia, digital literacy still needs to improve [14] and some schools are still lacking in terms of facilities, mostly when focusing on digital education [15]. Some projects have been initiated for addressing these issues, mostly in terms of digital literacy. Regarding this, mainly through the Ministry of Post and Telecommunications (MPTC), the goal to enhance digital literacy has been set as a priority, but more work and time are required for obtaining the desired results. Additionally, university students could have a better chance of being capable to benefit from MOOCs, but currently, Cambodia is still lacking a framework or official guidelines from the Ministry of Education, Youth, and Sport (MoEYS) on the implementation of MOOCs in the curriculum, and some universities are exploring the possibility. Mostly during Covid times, the Cambodian Government through its ministries has shown commitment with the establishment of initiatives for supporting distance learning, with the major project represented in an app presented by the MoEYS to facilitate online learning. Yet, there is the need for more work and time, mostly in terms of introducing a framework of monitoring and evaluation to guarantee the effectiveness of these newly introduced solutions. Furthermore, indicators such as faculty self-perceptions, faculty technology literacy skills, and student's perception of the quality of instruction have been reported as elements influencing the effectiveness of learning experienced relying on MOOCs [16] and should be taken into consideration in order to perform a constant evaluation and improvement cycle capable of merging the MOOCs into the normal curriculum and learning activities.

If MOOCs can represent a useful tool for learning designers, it is essential to understand and study how they can be implemented in an appropriate way in the learning design at the higher education level, tailored to the specific and peculiar case of Cambodia. Essential elements to investigate are represented by understanding which MOOCs platforms students currently know and use, what are the reasons causing them to not finish or drop from these courses, which affordances of ICTs students benefit by using MOOCs for their learning, and, in general, what are the positive and negative factors students see with the usage of MOOCs in their learning endeavors. These are the questions that we try to answer with this paper. The remainder of this article is organized as follows: Section 2 presents the literature review of MOOCs implemented in higher education. Section 3 provides an overview of the methodology of this research work. Section 4 contains the results and discussions followed by conclusions in Section 5.

2. Literature Review: MOOCs in Higher Education

In the last ten years in the educational ecosystem around the world, considered as those social infrastructures composed of different actors who engage in a meaningful collaboration aiming to create and implement innovative solutions for tackling current educational challenges, the MOOCs wave has given rise to many promises and expectations. Many research works have pointed out how MOOCs can be used as a powerful tool for supporting education, mostly during Covid times, when remote teaching and learning emerged as a global challenge. But they require a learning design process, where the absence of which could completely undermine any hope of effectiveness.

With a specific focus on Higher Education (HE), a discrete number of research studies have been conducted in order to analyze the implementation of MOOCs in HE Institutions (HEIs) [17–23]. From the literature, it emerged that the profile of learners in the MOOCs ecosystem is very varied, ranging from students to professionals and from developing countries to developed ones. Additionally, their learning style and characteristics are multi-faceted. Specifically, Kahan et al. [24] identified four different profiles of students following MOOCs, namely "dropout," "perfect students," "gaming the system," and "social." The authors examined the different types of participant behavior in a MOOC, classifying them into seven types of behavior, namely "Tasters," "Downloaders," "Disengagers," "Offline Engagers," "Online Engagers," "Moderately Social Engagers," and "Social Engagers" [24].

Discussing the effectiveness of MOOCs, some authors expressed their skepticism on MOOC initiatives [25], describing them "as little more than costly sales pitches for universities to recruit top students, or even more insidiously, as a way of reinforcing colonial views of knowledge" and at risk of "de-legitimizing local knowledge production." The implementation of MOOCs in an effective way in the learning process is not easy and is currently under research. Kim [26] offered an overview of the status of MOOCs in HE, providing a summary of the history, business models, and instructional strategies, highlighting common issues with the adoption of MOOCs such as low completion rate, loss of motivation in learners, and technological solutions used by the most common platforms offering MOOCs. Billington & Fronmueller [27] identified grading, cheating, course credit, the interaction between instructor and learners, and prerequisites as the major issues with using MOOCs for supporting learning activities. Furthermore, a low level of application of quality assurance processes and procedures for MOOCs combined together with the lack of robust assessment data makes it difficult to obtain any evidence about MOOCs being capable to support quality education offered by HEIs [28]. Wang et al. [29] identified in lack of social presence, interaction, and support as three main factors undermining students' engagement with MOOCs. Kumar & Al-Samarraie [22] posed some doubts on the implementation of MOOCs in the long run, stating that "some instructors found that MOOC is redundant as they have been using the LMS [Learning Management System] in the same method and, in addition to that, they do see the students on a weekly basis, which contradicts the idea of MOOC itself that promotes autonomous learning usually for long-distance programmes." For developing countries (like Cambodia), a common problem has been identified in a weak ICT infrastructure, internet penetration [20], or electricity shortages [17]. For the Cambodian case, its Government has shown its commitment in addressing these issues by establishing several frameworks and projects to improve the ICT backbone and reduce power shortages throughout the country, with remarkable improvements reached in the past years, but more time is needed to reach the goals set by the Government. Finally, Zhang et al. [30] raised the concern about how MOOCs could only be benefitting elite universities; thus, contributing negatively to the claimed ability in democratizing education.

On the other hand, MOOCs have been identified also as tools that positively support learning activities. In this regard, Bralić and Divjak [31] confirmed that "using MOOCs in blended learning supports part-time students in achieving their learning goals," providing recommendation to instructors such as letting students choose the courses they are most interested in, following a clear learning design capable of highlighting workload and

expectations from students when using MOOCs, and setting learning outcomes capable to "properly connect online and offline learning" while creating "an environment that ensures achieving those outcomes." Kursun [32] showed that using accredited MOOCs bearing credits enhances a higher achievement in students compared to learners who follow MOOCs that do not provide college credits. Larionova et al. [23] empirically showed "some evidence for the efficacy of MOOC-style learning in humanities disciplines" and pointed out "the effectiveness of a blended learning approach, with blended learning technology producing better educational outcomes for students." Alhazzani [33] analyzed the MOOC's impact on Saudi HE, showing that MOOCs have "a direct impact on developing students' learning skills" and "on effective communication." Finally, Ossiannilsson et al. [34] concluded saying that MOOCs can represent a useful source of data, which, through learning analytics, learners, academics, and institutions, can obtain "data on a huge range of issues, which can facilitate course development, support organizations, and map learning styles and patterns, thereby fostering and enhancing personal learning."

Analyzing the specific case of Cambodia, the implementation of MOOCs in the Cambodian ecosystem should require, as prerequisites, a good communication infrastructure to support internet penetration and enough digital literacy for the learners to use digital tools for supporting their learning. Currently, the telecommunication infrastructure of Cambodia is growing fast [35], and the usage of the Internet is quite common, mostly between the younger generations. In fact, "while only one in four rural farmers own smartphones, that number is much higher among younger people, that represents around 80 percent of the smartphone owners" [35]. In 2018, 96% of the population owned a mobile phone, and 100% of Cambodians were living within reach of a mobile-cellular signal, a figure second only to Singapore in the region [36]. The second element besides a good ICT infrastructure is represented by digital literacy, which at the moment is still lagging behind in Cambodia [37]. MOOCs represent a very seducing solution to support education in Cambodia for students, and also for teachers as a tool for supporting professional development [35], at a low cost for Ministries and schools/universities. However, effective implementation of them in the education sector would require a complicated process and elaborate design, which is a fundamental element to consider for effective implementation of MOOCs in a curriculum.

This process of implementation of MOOCs in the Cambodian ecosystem should start with understanding the current status, which, at the moment, has not yet been investigated and no research work is present in the literature. Currently, in fact, to the best of these authors' knowledge, there is no work in the literature focused on the implementation of MOOCs in Cambodia, and a total lack of research on this topic is present in the Cambodian educational ecosystem, characterized by its peculiarity due to the recent history of social unrest first, and fast development after. Considering this clear gap in the literature, this case study of a higher education institution in Cambodia, aims to investigate the awareness of MOOCs among university students, the approach to learning of students with MOOCs, and the ICT affordances exploited with the use of MOOCs for learning. The results of this research work offer useful insights for the stakeholders involved in the considered HEI and it also represents a pilot study for the whole HE Cambodian ecosystem.

3. Methodology

The study considered HEI is a small-size accredited private institution, with relatively high tuition fees (for local standards), but that offers a large number of scholarships every year, with a consequent majority of enrolled students currently studying with the aid of a scholarship, ranging from 25% to full coverage. This provides a wide variety of different students, ranging from wealthy to relatively financially struggling backgrounds, thus providing a non-homogenous pool of student profiles. In accordance with the positivist approach required for an empirical analysis of a not yet investigated ecosystem like Cambodia, very peculiar and unique due to its recent turbulent and dramatic past, we chose a quantitative dominant mixed methods research. Mixed method research is "the type of mixed research in which one relies on a quantitative, postpositivist view of the

research process, while concurrently recognizing that the addition of qualitative data and approaches are likely to benefit most research projects" [38]. This mixed mode approach was deemed appropriate given the need to "gain a more complete understanding of issues and hear the voices of participants" [39]. The approach of performing quantitative research followed by qualitative research is usually adopted for using qualitative data to support quantitative findings [40]. This explanatory sequential design typically involves "an initial quantitative instrument phase" followed by "a qualitative data collection phase, in which the qualitative phase builds directly on the results from the quantitative phase" [40]. In short, in this research work, these authors opted for a mixed mode approach following the example of Yin [41], who chose this approach for investigating learners' perception of MOOCs in the Chinese context.

Additionally, the selected HEI has a total student population counting less than 750 students. Due to the simplicity of reaching the student population using their institutional email, and aiming to avoid the introduction of bias and errors in this phase, the whole undergraduate student population at the selected HEI could have been theoretically considered. However, taking also into consideration the unlikeness of having the whole population answering the questionnaire, the answers collection continued until the number of respondents reached the minimum sample size suggested by Krejcie and Morgan [42]. For a total student population of fewer than 750 students, Krejcie and Morgan [42] suggest a sample size of 254 students.

In phase one (quantitative phase), we utilized an adapted questionnaire following Aldowah et al. [43]. The questionnaire was created in five main parts. Specifically, section one aimed to gather the general biographical information of the respondents such as age, nationality, and gender. The second part aimed to investigate the awareness of the respondents about MOOCs and the MOOCs platforms offering them. Additionally, this section of the questionnaire collected quantitative information about the previous usage of MOOCs for learning, like the number of courses completed, or started and then dropped. Furthermore, the following section aimed to investigate the main reasons for not completing/dropping out from MOOCs, adopting the questions used in Aldowah et al. [43]. Section four of the questionnaire focused on evaluating the respondents' approach to learning using MOOCs, based on the questions of Herrmann et al. [44]. Finally, the last section of the questionnaire included items on ICT affordances in accordance with Cope and Kalantzis [1] the respondents felt were benefitting from and taking advantage the most of by using MOOCs to support their learning activity. Each question consisted of the definition of one ICT affordance, as defined by Cope and Kalantzis [1], formulated as a question requiring an answers in the form of "strongly disagree" to "strongly agree" (through the usage of a Likert scale).

After the first phase of this research work (quantitative phase), a second phase (qualitative phase) was conducted with qualitative data collection using interviews. Since this phase aimed to "gain a more complete understanding of issues and hear the voices of participants" [39] adding more insightful information on top of the results obtained by the first phase, and in accordance with the mixed method research adopted, we had to select a specific population of students to interview, thus performing a sampling. Regarding this, between the different sampling approaches, purposive sampling is a non-probability sampling where the researcher targets a "particular group, in the full knowledge that it does not represent the wider population; it simply represents itself" [45]. "This is frequently the case in small-scale research" [45], something that characterizes the study case carried out in this research work. According to Hair et al. [46], the general rule is to have a minimum of five observations per variable, with an acceptable sample size equal to ten observations per variable. Considering that in phase two of this minor dissertation the investigated variable can be considered as the degree of difficulty encountered with using MOOCs, and due to the limited resources to perform a high number of interviews, six students were interviewed after obtaining their consent in participating—five were suggested by Yin [41]. More specifically, the members of the sub-sample population were

interviewed individually online, using Google Meet (due to social distancing imposed by the pandemic).

The interview approach adopted represents a direct personal investigation with the purposive sample performed after an initial analysis of the data collected in phase one, which allowed us to select a sample student population who expressed the most difficulties with the usage of MOOCs in their learning activities. More specifically, the adopted purposive sampling followed the criteria of choosing those respondents who completed one or fewer MOOCs, and at the same time dropped from one or more MOOCs. This criterion assured the selection of student who tried to study with MOOCs but without showing much success (completed not more than one) and who encountered difficulties highlighted by the fact that they dropped from one or more MOOCs. Additionally, since different level of study (freshmen to seniors) could imply different experience and, thus, different difficulties, once the pool of purposely selected students was generated, an additional stratified sampling was performed, dividing the students by year (freshmen, sophomore, juniors, and seniors) and randomly selecting two from each stratus, for a total of eight students.

Finally, the interviews were carried out following the example of Yin [41] and using a semi-structured approach. Semi-structured interviews rely on a semi-structured interview guide, which de facto represents a schematic representation of the questions, and of the research goals [47]. Prepared questions functioned as interview guidelines, served the purpose of exploring in a more systematic and comprehensive way, and supported keeping the interview focused on the desired line of action [47]. Due to the pandemic, and consequent social distancing regulations, the interviews were conducted online using the Google Meet service.

4. Results and Discussions

Regarding the questionnaire participation, a total of 265 students responded, a number that after the process of removing those that did not confirm the voluntariness of participating in the questionnaire, became 258. In accordance with Krejcie and Morgan [42], for a population counting 750 individuals, a sample size equal to 254 is appropriate. Considering that the student population at the considered HEI counts less than 750 students, the number of total answers can be considered a sufficient number representative of the whole student population of the considered university.

4.1. Demography

Analyzing the participant population, we recorded a total of 43.8% female and 56.2% male respondents. Between them, the majority of the students who responded to the questionnaire were in the range of age between 19 and 20 years old, 22.6% in the range 21–22 years old, and 14.7% with age 18 or below. The rest of the students recorded the age of 23 or above. Finally, among the respondents, 38.1% were freshmen, 23.4% sophomores, 23.8% junior students, and the remaining (14.7%) were seniors. Finally, 99.2% of the respondents were Cambodian, with only two students reporting coming from a country outside the ASEAN community.

4.2. Awareness

Section one of the questionnaire investigated the awareness of students of MOOCs, MOOCs platforms, and experience with MOOCs (MOOCs completed). Of the respondents, 51.4% responded to not have heard the term "MOOC" (independent of knowing a platform offering MOOCs or not) before starting the questionnaire. Additionally, 67.3% of them heard about MOOCs for the first time at school/university, with 9.3% from social media and the same amount from surfing the internet. Furthermore, 8.6% of the respondents heard about MOOCs for the first time from friends or peer students. The remaining declared to have heard about these courses from other sources.

4.3. MOOCs Platforms

In section two of the questionnaire, the students were asked about which online platforms offering MOOCs the students knew before the pandemic, got to know only after the COVID-19 period, or have not heard about yet. Coursera, edX, Udemy, Khan Academy, and Codecademy resulted as the most well-known platforms overall, with Khan Academy being the most well-known online platform offering MOOCs before the pandemic, and Coursera being the most well-known after the COVID-19 period. Additionally, at the moment of responding, more than 50% of the students who responded to the questionnaire declared to not know about any other platform offering MOOCs other than Coursera, Khan Academy, Udemy, and edX. Additionally, the results showed that the pandemic affected positively the number of students aware/informed about these platforms, but with a major change involving only Coursera, which recorded 43.58% of respondents who got to know about this platform only after the pandemic, and increasing the total number of students who knows Coursera from 47.47% to 91.05% at the moment of responding the questionnaire. The only other platform that registered an increase of at least 10% (of the whole population of respondents) in popularity due to the COVID-19 issue is Codecademy, which was discovered by 10% of the respondents after the pandemic invaded Cambodia.

The drastic increase in popularity of Coursera is easily explained by the fact that the considered HEI joined the program offered by Coursera (Campus Response Initiative), which, during the pandemic, opened to HEIs in the world access to 3800 of its courses with certification, for free. Thus, after joining the Coursera Campus Response Initiative program, the selected HEI extensively informed its students, staff, and faculty about this opportunity, and many Coursera courses were used to replace or support classes, which moved from offline to fully online. Even so, the results from this research work showed that the students are still not very well informed about the existence of many platforms, and, even after the COVID-19 situation, only Coursera, Khan Academy, Udemy, and edX recorded 50% (or more) of students knowing them, with only Khan Academy passing the 70% edge and Coursera passing the 90% edge. This scenario depicts a situation where students, even after months of imposed online learning and extensive campaigns from the university on MOOCs and MOOCs platforms, with an obvious focus on Coursera, overall remain not well informed on even the existence of MOOCs and platform offering MOOCs.

4.4. Drop Out Rate and Completion

Section three of the questionnaire aimed to obtain quantitative data on MOOCs dropped by students and investigated the reason why the respondents dropped or never completed a course. In order to understand the reasons for dropping out of a course, we relied on the questions from Aldowah et al. [43], where the author identified 12 major reasons for dropout, namely academic skills/abilities, prior experience, social interaction (interaction with peers), social presence (interaction and communication), course design, content difficulty, commitment, course time, feedback (on performances), motivation, social support, and family work circumstances. A total of 69.6% of the respondents reported having dropped out from one or more MOOCs, considering that 25.3% of the students reported having never completed any MOOC. Furthermore, the respondents were asked to select the reason(s) that they considered suitable in relation to the influence on their drop out, using a Likert-type scale from 0 to 4 (0 = no influence, 1 = very low influence, 2 = low influence, 3 = high influence, 4 = very high influence). Additionally, to ensure internal consistency in the answers of the participants, the Cronbach Alpha was measured for the answers in these 12 questions, obtaining a value of 0.87, which is considered very good for internal consistency. The obtained results are reported in Figure 1.

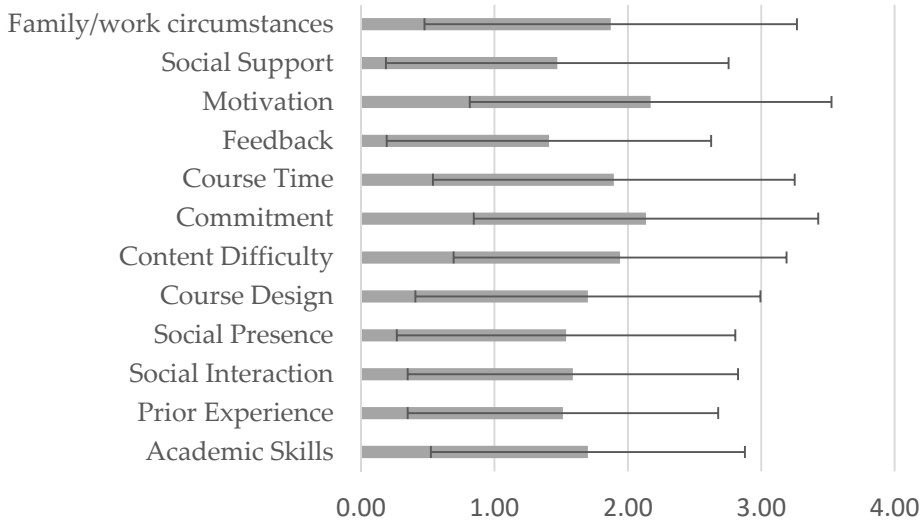

Figure 1. Reasons for dropping out from MOOCs (Not Relevant (0) to Relevant (4)).

Furthermore, the numbers obtained by the questionnaire, which are based on the sole student's answer, highlighted the problem of high dropout rate and low completion rate of MOOCs, an issue already pointed out in many research studies. In fact, following the data, 69.6% of respondents (179 students) reported to have dropped or never completed (abandoned) at least 1 MOOC, with 10.5% (27 students) having dropped from more than 5 MOOCs. Considering that 25.3% (65 students) reported having never completed any course (whether they have ever tried to start one or not), it shows that many students face the same problem reported several times in the literature: high dropout rate between MOOCs learners, with the main reason identified in lack of motivation.

4.5. Student's Approach to Learning

Section four of the questionnaire aimed to investigate the respondent's approach to learning using MOOCs, adopting the 12 questions in Hermann et al. [44] used to measure the student's approach to learning (SAL). Hermann et al. [44] classified these 12 questions ("yes" or "no") into three categories, each of them aiming to measure the level, respectively, of a deep approach to learning (DL), organized efforts (OE), and surface approach to learning (SL). Considering the results as "yes" equal to 1, and "no" equal to 0, in Table 1 and Figure 2, it is possible to see the averaged response of the participants for deep learning, surface learning, and organized effort.

Table 1. Approach to learning by academic year (0—Missing Completely to Reach, 1—Fully Reaching).

Academic Year	Deep Approach	Surface Approach	Organized Effort
Freshmen	0.84	0.61	0.66
Sophomores	0.89	0.65	0.68
Juniors	0.76	0.56	0.57
Seniors	0.87	0.47	0.64

Furthermore, analyzing the results, it is possible to see that in accordance with the answers of the students, on average, the respondents felt like they were reaching a satisfactory level of deep learning (1 means fully reaching, 0 means missing completely to reach) with a level higher mostly for sophomore and seniors. It is interesting to see how freshmen expressed an overall satisfactory level of deep learning approach to learning.

It is important to highlight the fact that these numbers are based on the self-assessment and self-perception of students themselves. However, student's perception is influenced by many factors and it not completely reliable; as Struyven et al. [48] point out: "students' perceptions of poor learning, lack of control, arbitrary and irrelevant tasks in relation

to traditional assessment contrasted sharply with perceptions of high-quality learning, active student participation, feedback opportunities and meaningful tasks in relation to alternative assessment." Thus, these results, although providing interesting insights on how students perceive their own approach to learning, must be viewed with consideration.

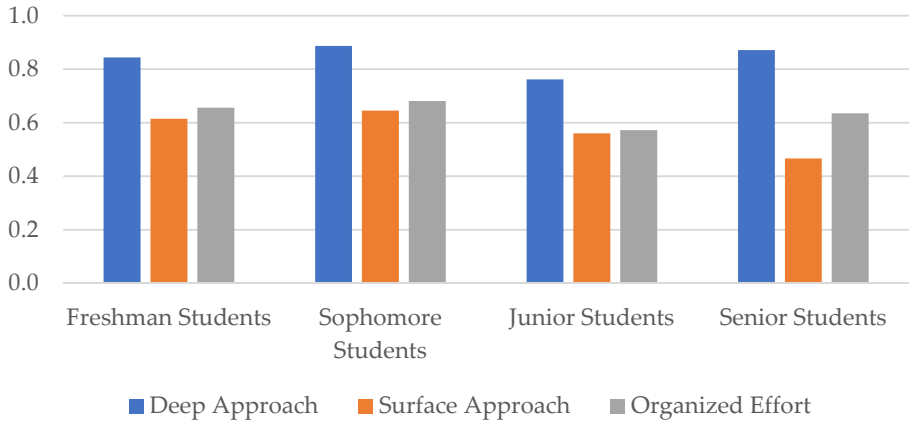

Figure 2. Approach to learning by academic year (0—Missing Completely to Reach, 1—Fully Reaching).

4.6. ICT Affordances

The following section of the questionnaire focused on investigating which affordances that ICTs offer to education, in accordance with Cope and Kalantzis [1], are currently exploited at the considered HEI with the usage of MOOCs for learning. The section was proposed in a form of seven questions as a Likert-type scale from 0 to 4, with 0 complete disagreement with the statement, and 4 complete agreements. Each of the questions was created as a description of each of the ICTs affordances defined by Cope and Kalantzis [1], with the description tailored specifically to the MOOCs. The results are visible in Figure 3.

The results show ubiquitous learning as the ICT affordance majorly exploited by students with the usage of MOOCs, with collaborative intelligence being the least explored. This shows how the MOOCs are still seen by the students as a mere way to study anywhere and anytime, giving them the freedom of ubiquitousness, but leaving behind other affordances that are fundamental to explore for effective learning to take place.

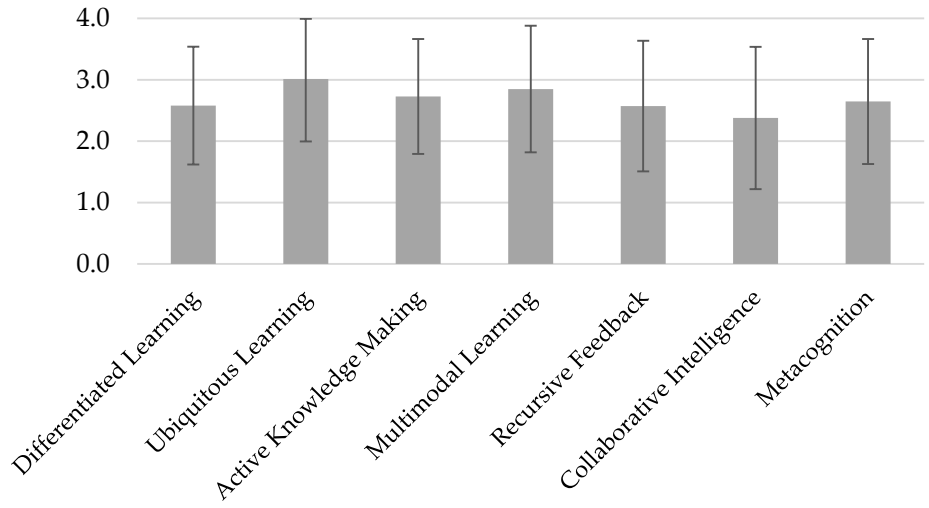

Figure 3. Affordances of ICTs in education exploited by using MOOCs (Not Relevant (0) to Relevant (4)).

4.7. Interviews

After the first phase, the second phase of this research work focused on deeper investigation of the difficulties that students encountered/experienced with the usage of MOOCs for supporting their learning experience. A total of 8 students were selected, and more specifically, 2 for each stratus of the stratified sampling approach (freshmen, sophomores, juniors, or seniors). The semi-structured interviews were conducted online using Google Meet, and they followed these 5 questions:

1. Do you see any problems with the usage of MOOCs at the university level?
2. How did these MOOCs benefit or hamper/impede/obstruct your learning?
3. Have you had any positive/negative experiences while using MOOCs? Please motivate your answer.
4. The majority of online courses are provided in English. Does this represent a barrier for you in order to complete an online course?
5. What are the major difficulties you have encountered with the adoption of MOOCs supplementing your daily university activities?

After a systematic analysis, it was possible to identify and categorize the common elements that emerged from the interviews into two main subgroups: positive and negative aspects of using MOOCs for supporting learning. In the following, the interviewees are referred to as FR1 and FR2 for the freshmen students, SO1 and SO2 for the sophomore ones, JU1 and JU2 for the juniors, and SE1 and SE2 for the seniors.

Relevant to the positive aspects that emerged from the interviews, the major positive aspect of using MOOCs for supporting the student's learning activity was represented by the wide variety of topics covered by MOOCs that are offered throughout the several platforms students know. Platforms offering MOOCs, in fact, provide the chance to students to explore many different courses in fields that are not taught at their university. For instance, SO1 stated that "psychology is hard to study [find courses about it] in Cambodia," remarking that by using MOOCs students can "learn something we [the students] want to learn in other majors." FR1 supported the same concept saying: "I can find a lot of courses nicely made and well structured." SE1 added that students can "learn a lot of things teachers [. . .] don't teach," confirmed by the general thought of FR2 who said that "MOOCs provide a lot of information which a single school could not [provide]." This finding is in alignment with one of the well-known benefits of MOOCs, which is being capable of offering the chance to anyone with an Internet connection to access to an ivy league education in virtually any field, an affordance that underpins the claimed ability of democratizing education [19].

Between the negative aspects of adopting MOOCs, three main categories were identified: technical issues, motivational/organizational issues, and social presence issues. Focusing on the technical issues, the major problems emerged with the internet connection, an issue common to developing countries, as stated by Idrissi Jouicha et al. [20]. SE1 expressed concern with the internet signal not being good, or the connection being too slow. The same was confirmed by FR2, who said that the "Internet in Cambodia is not good, mostly in the countryside," sharing the same opinion of the 2 junior students. JUN1 specifically added that Cambodia is affected by "poor internet connection, mostly in the provinces." Additionally, SO2 noted that they have an old computer, which makes things difficult in addition to a slow internet connection. These findings highlight the undermining threat of a lack of national ICT infrastructures mentioned in Idrissi Jouicha et al. [20]. The inability to offer a stable internet connection to MOOCs users, in fact, represents a serious threat to any form of eLearning.

In addition to technical issues, the second category of common issues was identified in motivational/organizational issues. Specifically, the absence of deadline and self-organization, two important elements for students as mentioned in Bisin & Hyndman [49], emerged as common problems between the majority of the respondents in this second phase. The absence of deadlines seen as an issue for the students was confirmed by FR2 who said that "if I have no motivation, I just push forward." JU2 confirmed the

issue, stating that "without deadlines I get lazy." The absence of deadline is an issue that undermines the ability to concentrate and endure in the studying activity, worsened by the distraction coming from the home environment, which, for many students, is not set up for facilitating learning. This was confirmed by S1, who said that when at home, the family assumes they are free and, thus, ask to help with the family business.

Finally, the third category of issues identified was social presence. Students expressed their concern and difficulties with the absence of social interaction (with peers learners) and with instructors (the more knowledgeable one), supporting the findings in Wang et al. [29]. FR1, in fact, stated that "if I don't understand something it is hard to find [the answer] for myself on the internet." FR2 also highlighted the issue of "feeling alone" while using MOOCs and classified under this feeling both the issue of absence of interaction with peer learners and the feeling of being left alone during the study activity. The same concept was remarked by JU1, who said that there is "no engagement with teacher or classmates" while using MOOCs and described how studying MOOCs is all about "just read and watch, no discussion." The lack of interaction was confirmed also by SE1 and SE2, who reported the same issue with the absence or lack of interaction while studying with MOOCs.

In summary, students showed a relatively low awareness of MOOCs, with only the Coursera platform standing partially out in terms of awareness. This is explained by the adhesion of the considered HEIs to the Coursera program available during the data collection period. Additionally, the low number of completed courses and the relatively high number of courses started and never completed, or dropped, confirms one of the common issues with MOOCs: the high dropout rate. In accordance with the results, issues with an Internet connection, solitude, lack of motivation, and commitment represent serious issues faced by the students, who still see MOOCs as a mere tool for learning from the comfort of their home, without benefitting from the opportunity to interact with other learners, and thus, missing the benefits from one of the seven principles of learning defined by OECD: "social nature of learning" [6].

5. Conclusions

This research work represents a first investigation of the current HE ecosystem in Cambodia on the usage of MOOCs by university students, beginning with the study case of a specific HEI. In the literature, these authors found a clear lack of research on MOOCs usage and implementation in the Cambodian HE. Aiming to take a first step in filling this gap, this works investigated the awareness of MOOCs between university students, the approach to learning of students with MOOCs, and the ICT affordances exploited with the use of MOOCs for learning in a selected HEI.

The findings of this research work on the usage of MOOCs confirmed the issues raised in previous research works present in the literature and referring to other ecosystems in other regions, such as low completion rate and high dropout rate, due to technological issues (poor ICT infrastructures, and absence of electronics devices like laptops or computers), lack of digital literacy, absence of social interaction with instructors and fellow learners, and lack of self-organization and motivation. All these issues were also found in this research work, focused on the study case of the considered HEI in Cambodia. Additionally, the findings in the work pointed out how still too many students are not aware of the existence of MOOCs, an interesting point to consider, mostly if the Cambodian HE sector, and the education sector in general, aims to use these courses for supporting students' learning. With respect to MOOCs awareness, this research work showed how the pandemic increased among students the awareness of MOOCs and platforms offering them, but this increase was recorded in an evident way only for Coursera, which was the platform extensively proposed to the students through the university itself. Knowledge about platforms offering MOOCs should be the first step for making sure that students know about this tool for supporting learning.

However, awareness is not the only issue to address. Our findings, in fact, pointed out a lack of an organized and systematic approach to learning when using MOOCs.

Specifically, even if the students reported a satisfactory level of self-assessed deep learning approach, the level of organized effort results were low, which points out that students are in general not very organized and systematic in the way they approach learning using MOOCs. This was confirmed even during the interviews where students highlighted the issue of loneliness and feeling lost during their interaction with MOOCs, exacerbated by the technical issues connected to lack of ICT equipment, like computer or laptop, and by the lack of ICT infrastructure in Cambodia. These findings highlight the importance of not simply introducing students to MOOCs, but implementing these courses in an articulated learning design process, while at the same time enhancing the ICT infrastructure in the country, which is still not capable to offer a good Internet experience to students mostly in the provinces. Regarding the implementation of MOOCs in a learning design process instead, it is possible to conclude that a major issue, highlighted by our research work, still lays in the way MOOCs are implemented in the curriculum and the learning activities, pointed out by the ICT affordances exploited by the usage of MOOCs in the considered university, and profiled in the last section of the questionnaire. In this section, in fact, students identified ubiquitous learning as the major benefit offered by MOOCs, leaving behind other ICT affordances that MOOCs, through ICTs, offer. This shows a lack of planned and structured implementation of MOOCs in the curriculum.

Discussing the limitations of this research work, we need to highlight the fact that the considered HEI is a quite new institution of small size, with the number of the student population not exceeding 750. Additionally, in the considered HEI, all lessons are carried on using the English language. Thus, this study case did not highlight one of the possible issues of the usage of MOOCs in a country where the native language (Khmer) is usually different from the one used in the MOOCs. We foresee, in fact, the language barrier as a further major issue with the implementation of MOOCs in the Cambodian HE. For these reasons, further studies should extend the investigated ecosystem, accounting for a wider variety of different institutions, including public ones, and those mostly where the communication medium of only Khmer language is used. Furthermore, even if the current HEI has a non-homogenous pool of students' backgrounds due to its scholarship policy, it is an HEI of small size and private, both factors to take into consideration if a reader would want to use these results for making very general conclusions on the whole Cambodian HE. In fact, it should be said that the considered HEI is one of the most active in MOOCs implementation throughout the country, proven by the absence of any other research work conducted in Cambodia on MOOCs and MOOCs implementation. Thus, we foresee these results as skewed toward the positive side in respect to the overall current situation in the HE Cambodian sector.

In conclusion, this research work represents a first investigation of the current implementation of MOOCs in a HEI in Cambodia, something completely missing in the current body of literature. The results point out the fact that the considered HEI is still at its early stage of MOOCs implementation in the learning activities, scaffolding, connection between learners, and alignment with learning outcomes. In short, it can be said that a process of learning design must take place following the findings of this research work and following the pedagogical theories of ICTs applied to education. It is important to avoid the scenario depicted by Barman et al. [25], who, referring to MOOCs, defined them "as little more than costly sales pitches for universities to recruit top students, or even more insidiously, as a way of reinforcing colonial views of knowledge." Finally, in accordance with the findings of this research work, we can suggest to the considered HEI to include MOOCs in an articulated learning design process, and provide support to the instructors who may be not experienced in the learning design process, while creating a framework of evaluation and feedback for creating an improvement cycle with the students at the center. In general, from the perspective of the HE sector instead, these authors suggest creating a campaign to enhance awareness of online MOOCs platforms, and offering training to HEIs' staff and faculty on how properly include MOOCs in their curriculum, while focusing

on improving the ICT infrastructure in the country, which is the essential backbone for enabling the numerous ICT affordances in education.

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