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A Case Study of Applying Open Educational Practices in Higher Education during COVID-19: Impacts on Learning Motivation and Perceptions

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Received: 20 September 2020; Accepted: 28 October 2020; Published: 3 November 2020

Abstract: Open Educational Resources (OER) have been researched for a long time in the open education field. Researchers are now shifting their focus from resources to practices for delivering open education, an area called Open Educational Practices (OEP). However, there is little information in the related literature regarding the design of an OEP-based course or the impact of these types of courses. Therefore, this study designs a new OEP-based course at a public university for teaching family education during the COVID-19 pandemic. It also investigates its impact on learning motivation and teachers' perceptions. In this context, a practical pilot experiment using both qualitative and quantitative methods was conducted. Specifically, 36 learners participated in this experiment. The obtained findings highlight: (1) an innovative design framework for OEP-based courses that teachers can refer to in their contexts; (2) that learners had a high motivation level in terms of knowledge achievements, individual connection and engagement when taking the OEP-based course; and (3) several advantages and challenges of the OEP-based course from the teacher's and learners' perspectives. For instance, the teacher reported the fear of losing control over the learning process when applying OEP. The findings of this paper can help researchers and educators in adopting OEP in higher education especially in times of crises, as well as increase the sustainability of OEP, hence contributing to open education development.

Keywords: open educational resources; open educational practices; open education; learning motivation; family education

1. Introduction

1.1. Open Educational Practices

The term "Open Educational Resources" (OER) was first coined at UNESCO's 2002 Forum on Open Courseware, and it was recently defined by UNESCO [1] as "learning, teaching and research materials in any format and medium that reside in the public domain or are under copyright that have been released under an open license, that permit no-cost access, re-use, re-purpose, adaptation and redistribution by others." Several research studies have highlighted that OER have several advantages, as they facilitate knowledge sharing, reduce learning costs, and ensure inclusive learning [2,3]. Due to

these advantages, several universities have started adopting OER worldwide. OER were also listed as one of the emerging technologies and practices in the 2020 EDUCAUSE Horizon Report [4].

With the rapid evolution of the open education concept, researchers have shifted their focus from content-centered approaches, which mainly focus on educational resources (creation, sharing, etc.), to more practice-centered ones that foster collaboration between learners and teachers for creating and sharing knowledge [5]. In other words, researchers and educators have shifted their focus from creating and publishing OER to practices that can be implemented using OER for education; these are referred to as Open Educational Practices (OEP). A number of researchers have mentioned that OEP contain many different dimensions beyond the simple use of OER [6–9]. Ehlers [10] also emphasized that using a repository of OER in a traditional way is considered to be content-centered or teacher-centered, but it is not OEP. Furthermore, Wiley and Hilton [11] regarded OEP as an OER-enabled pedagogy and defined it as a "set of teaching and learning practices that are only possible or practical in the context of the 5R (retain, reuse, revise, remix, and redistribute) permissions that are characteristic of OER."

OEP have become a growing trend in education based on information and communication technology [12]. Pulker and Kukulska-Hulme [13] considered teachers' activities when reusing and adapting OER-influenced teaching practices with evidence. OEP can expand the opportunity of accessing high-quality educational contents for learners by: (1) creating and (re)using OER in innovative ways, such as via social networks; and (2) providing active and engaging learning experiences where learners participate in the knowledge generation process. This can also help in achieving accessible and lifelong learning. Huang et al. [14] have recently conducted a comprehensive review of OEP definitions and presented an OEP framework, which is composed of five components, namely OER, open teaching, open collaboration, open assessment, and enabling technology. OER are educational resources that are shared under an open license and can be used within a given OEP-based course. Open teaching implies that teachers should implement teaching methodologies that can allow learners to actively contribute to the co-creation of knowledge and be self-regulated. Open collaboration implies that teachers should build open communities to foster teamwork (e.g., editing a blog, creating a Wikipedia page) and social interaction. Open assessment implies that teachers design learning tasks that foster not only teacher assessment, but also peer assessment. This can emphasize reflective practices and improve learning outcomes. Finally, enabling technology implies that teachers should use different technologies to facilitate the OEP within a course. These technologies include OER authoring tools, OER repositories, social networks, and collaborative editing tools. As shown in Figure 1, all these components are interrelated, and the relations among them are enabled by technology. For example, teachers can enhance learners' engagement in open collaboration via technology, such as social networks.

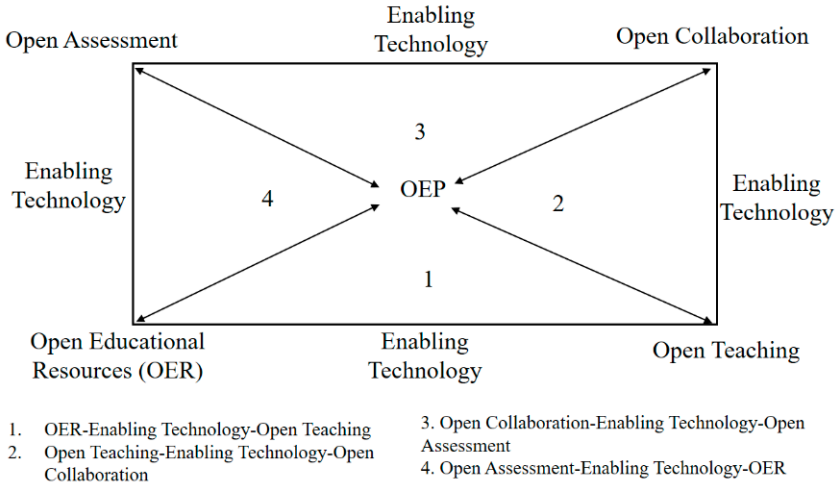

Figure 1. Open Educational Practices (OEP) framework for open education (CC BY 4.0) [14].

The importance of open education and OEP has rapidly increased, especially during the COVID-19 pandemic, as universities have had to maintain learning in a very innovative way and in a very short time [15]. For instance, several universities worldwide in such countries as China, Romania, Italy, and United States have applied OEP during the pandemic [15].

1.2. Research Gap and the Purpose of This Study

The emergence of OEP as a distinct research theme is relatively new [16] and is likely to continue growing in the future [17]. In this context, Koseoglu, Bozkurt, and Leo [17] further pointed out that several critical questions are still unanswered related to OEP, calling for further investigation. For instance, several research studies have pointed out that there are not enough details about how OEP can be implemented in higher education for teaching [18,19]. Bossu and Meier [20] reported that OEP have been applied in several countries like Brazil and Australia. However, no details were provided about how OEP were applied for teaching. Such details can facilitate the adoption of OEP by teachers in higher education. Additionally, it is seen that there is a lack of practical findings on the use of OEP in the literature. Little is known on the investigation of OEP-based courses' impact on learning motivation. Similarly, few studies have investigated how teachers and learners perceive teaching/learning activities that are designed based on OEP.

To summarize, this study contributes to the extant literature by going beyond discussing OEP as an emerging approach to practically: (1) discuss how to design OEP-based courses in higher education; (2) investigate in-depth via a pilot experiment the effects of a newly designed OEP-based course during the COVID-19 pandemic on learning motivation, as well as on learners' and teachers' perceptions. It should be noted that since this practical study was conducted during the COVID-19 pandemic, and several challenges were faced (e.g., time constraints), this study reports a pilot experiment to validate the OEP-based course. Finally, this study presents the lessons learned from this practical experience to facilitate the sustainability of OEP in higher education. These lessons could support universities in developing their own OEP-based courses, hence maintain sustainable learning even in times of crisis. They could also facilitate OER and OEP adoption worldwide and therefore contributing to achieving the United Nations (UN) Sustainable Development Goals (SDGs). Specifically, this study answers the following research questions:

RQ1. How to design an OEP-based course?
RQ2. What is the impact of the OEP-based course on learners' learning motivation?
RQ3. What are the perceptions of teachers and learners towards the OEP-based course?

The rest of the paper is structured as follows: Section 2 describes the designed OEP-based course, including the learning activities and practices. Section 3 presents the methodology of this study. Section 4 presents and discusses the obtained results. Finally, Section 5 highlights the lessons learned and presents future directions based on this research.

2. Case Study: Designing the OEP-Based Course

2.1. Motivation for Teaching "Family Education" Course

This open course was an institutional initiative to help parents in better communicating with their children, especially during the critical moment of COVID-19. The target audiences are parents or learners who are interested in family education. The course was open for everyone interested in this topic, and no prerequisites were specified to join this course. Additionally, taking or not taking this course did not have any impact on university grading, however a course completion certificate was provided for each person who finished this course. The course completion criterion was to finish all the weekly assignments provided by the teacher. It was promoted through the institute's social network channels, such as Wechat, and mailing lists to attract more learners (including parents) to join in this course. Parent-child relationships have a great influence on children's socio-emotional

and cognitive development and play a strong protective role in the situation of economic adversity or pandemics [21,22]. Thus, parent–child relationships during the pandemic could have long-term implications for children. There are four chapters in this course, covering typical problems of children of different ages, which are more reflected by parents. These four typical problems are: (1) the sensitive period [23] of a child from birth to age six, characterized by sensitivity to movement, order, small objects, and so on. This also includes sensitivity related to children's mental growth; (2) learning difficulties, especially homework problems of primary school learners. For instance, procrastination [24] has a negative correlation with learners' academic performance, and concentration problems are an issue which gives rise to the attention of parents; (3) game addiction, especially for middle and high school learners, which has received increased attention from parents, teachers, and researchers; and (4) effective communication with adolescents, since adolescence has a strong requirement for independence and maturity, and thus more conflicts could occur with parents.

It should be noted that the motivation behind mixing all ages in the same course is to also prepare parents for the future. This means that parents can learn about problems in several different ranges, even when they do not have children in that range (e.g., adolescence). Consequently, they will learn about these future problems that may encounter with their children as well as their solutions, and hence be prepared for them.

2.2. How to Design an OEP-Based Course?

This section aims to answer the first research question related to how to design an OEP-based course. In this context, to provide an engaging learning experience during the COVID-19 pandemic, the teacher applied OEP to teach a "family education" course. Specifically, the five OEP dimensions (see Figure 1) highlighted by Huang et al. [14] were covered. In this context, learning materials prepared by both teachers and learners were developed as OER under the CC-BY license (dimension 1). The teacher spent on average eight hours per week to facilitate the learning process and help learners. The learners on the other hand spend on average 6 hours per week to finish the weekly assignments and interact with both the teacher and their peers about the shared course posts. In addition, several enabling technologies that learners are familiar with were selected and used (dimension 2). Furthermore, the other three dimensions, namely open teaching, collaboration, and assessment were designed in this case study as follows.

To ensure open teaching, the teacher applied the connectivist learning practice [25] and learner-centered practice. Connectivist learning practice is grounded in connectivism where learners share and co-create knowledge by making connections that can last even after the course duration. In addition to the learning materials prepared by the teacher as OER about the potential problems that parents may face and how to deal with them, the learners were required to further enrich the prepared learning materials by searching for new problems that parents may encounter with their children and present the possible solutions to these problems. Search engines (such as Baidu) were recommended for the learners to retrieve learning materials for this learning activity. Live open courses on the Tiktok platform were also presented under the CC-BY license. The teacher's role was more that of a facilitator by, for instance, suggesting new references for the learners or guiding them during the search process (e.g., which search keywords to use).

To ensure open collaboration, learners were first randomly divided into six groups. Learners were then required to summarize what they had learned and create learning materials that included the obtained parent–child problems and their opinions as a team. In this context, Tencent Docs (similar to Google Docs) was used to facilitate the collaboration process, including cooperative writing and editing of the learning materials. Furthermore, Wechat, a popular social network, was used to improve the efficiency of the collaborative work through voice or video communications. The teacher's role in this case was to motivate learners and encourage them to exchange their opinions in order to build a holistic conclusion among all team members.

To ensure open assessment, all the prepared written materials of the learners, including their assignments, were collected to create an open-access supplemental learning material (under CC-BY license 4.0) that everyone could refer to and use in the future. This method of using non-disposable assignments [26,27] can benefit others and attract teachers and learners to further reuse or improve these assignments in the future. Meanwhile, formative assessments [28] were adopted to monitor learners and provide timely feedback that could be used by teachers and learners to improve their teaching/learning. Additionally, a public learning community on the social network Toutiao was built where learners could exchange ideas and discuss answers related to several assignments. For example, in Figure 2, the teacher posted a problem about a five-year-old girl who always bites her nails and invited learners to post their opinions and knowledge to solve this problem and discuss it with one another. She then asked three questions, and requested the learners to share their questions. As shown in Figure 2, each learner answered different questions from their perspectives. As a result, this method encouraged the learners to freely comment on one another's answers, hence triggering open assessment and self-reflection. Meanwhile, the teacher focused on encouraging the learners to exchange opinions in order to build an open, and trustful learning environment where everyone could feel free and safe, hence increasing learning engagement. Particularly, online mini projects, including preparing open license presentations or reports, were used for grading. It should be noted that no automatic methods (e.g., using learning analytics) were used to assess the learners' engagements. Therefore, the teacher had to do it manually, by keeping track of each learner's progress.

Figure 2. An online discussion about a particular problem behavior on Toutiao.

Finally, each team gave an open presentation on Zoom where other teachers, parents, and learners were invited to participate and share their opinions with the learners. All presentations were recorded and uploaded under an open license for others to watch and download. Figure 3 summarizes this practical experience and presents an OEP-based course framework that teachers can refer to in their contexts. As shown in this framework, teachers, learners, and OER (learning materials)—the main actors in a typical learning process—are interacting based on several OEP to fulfill open teaching, assessment, and collaboration. For instance, to fulfil open collaboration, social media and collaborative learning practices can be used with the learners to produce learning materials as OER. This can be facilitated by the use of technology such as Wechat. It should be noted that this framework can

be further enhanced by, for instance, adding more OEP that can be used to fulfil one of the three dimensions (open teaching, collaboration, and assessment); therefore, researchers are encouraged to continue working on it.

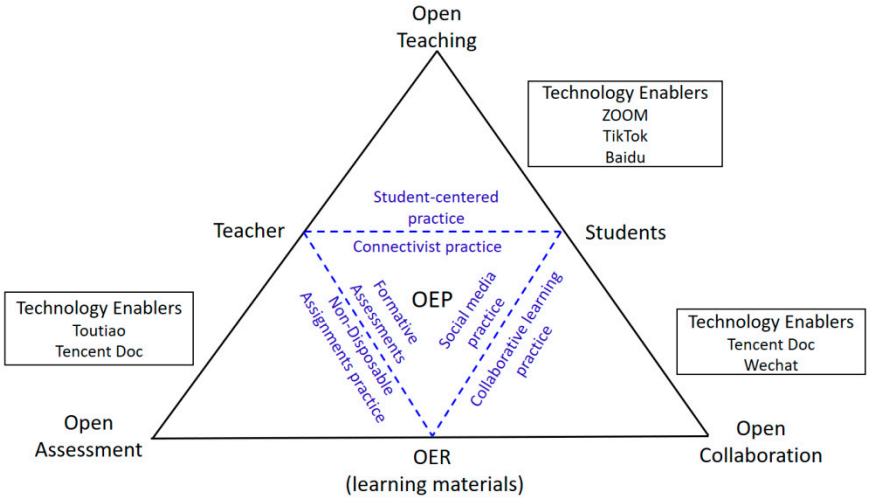

Figure 3. Framework for designing OEP-based courses.

3. Method

3.1. Participants

The "family education" OEP-based course was conducted during the second semester of the 2019 academic year at the Smart Learning Institute of Beijing Normal University. The course lasted for six weeks, and it was open and free of charge to the public; hence, everyone could enroll in it. Seventy learners enrolled in this course, but only 36 learners ultimately completed the entire course. One of the major reasons that parents (learners) reported for dropping-out of the course was time constraints under the COIVD-19 pandemic. They mentioned that they were overloaded, as they had to work from home on top of taking care of the home safety, their children and their learning process. As shown in Table 1, most of the learners reported that the motivation behind joining this course was: (1) to improve the parent–child relationship; (2) interest in this topic; and, (3) to prepare for the future by learning about their children's possible problem behaviors and solutions in advance. It should be notated that some of the learners had more than one child, and the children were of differing ages; therefore, they were counted twice in Table 1.

Table 1. Information statistics about the learners.

Gender		Participants' Children's Age Distribution				Reasons to Choose This Course		
Male	Female	0–6	7–12	13–18	Above 18	For Future Parenting Preparation	Improve Their Relationship with Their Children	Interested in the Course Topic
4	32	22	14	3	2	6	25	21

3.2. Procedure and Instruments

Due to time constraints in this critical moment of the COVID-19 pandemic, the conducted pilot experiment in this study followed the one shot case study design [29]. A five-point Likert scale motivation questionnaire (where 1 = strongly disagree and 5 = strongly agree) was developed to measure the motivation of learners at the end of this OEP-based course, since motivation plays an important role in learners' academic performance [30] and critical thinking [31]. The questionnaire contains twelve statements that cover three constructs, namely: (1) *knowledge achievement* investigates if the learners are satisfied with the gained knowledge, and if their knowledge about family education

was enhanced through the proposed OEP-based course. For instance, "Family education course was useful for me;" (2) *engagement* investigates learners' willingness and desire to participate in the learning process. For instance, "I sometimes get bored while taking this course." Smith and Hart [32] stated that meaningful learning cannot be achieved without engagement; and (3) *individual connection* investigates if the learners received and created social relationships during the learning process that made them feel connected with their peers during the course [33,34]. For instance, "I felt connected to my colleagues while learning family education."

The questionnaire reliability was analyzed using Cronbach's alpha [35], and the obtained values for the three constructs were 0.826, 0.742, and 0.793, respectively. This implies that the questionnaire is reliable since all the alpha values were above 0.7 [35].

Interviews were further conducted online to collect the perception of the learners and teacher about the advantages and challenges of the designed OEP-based course. Each interviewee was interviewed for an average of forty minutes. Interviews were recorded and transcribed verbatim.

3.3. Data Analysis

Quantitative analysis methods were conducted to analyze the motivation questionnaire using the R language [36]. Specifically, the average score, standard deviation, and median value of the three constructs were calculated. Additionally, the Pearson correlation coefficient, which measures the strength of the relationship between the three constructs, was also calculated using R.

Qualitative analysis, in order to gain an in-depth understanding on the interview results, was conducted. Specifically, the interview results were coded according to the coding schema presented in Table 2. The main idea is that the results from qualitative analysis should further support and explain the quantitative results.

Table 2. Coding schema for the qualitative analysis of interview.

Code	When to Use
Interaction	Use this code when the teacher/learners are talking about the interactivity within the designed OEP-based course.
Active learning	Use this code when the teachers/learners are talking about how the OEP-based course made the learners more active.
Cost	Use this code when the teacher/learners are talking about the cost of this OEP-based course.
Technology	Use this code when the teacher/learners are talking about the used technologies within the OEP-based course.
Sense of achievement	Use this code when the learners are talking about a sense of achievement when they took the OEP-based course.

4. Results and Discussion

4.1. What Is the Impact of the OEP-Based Course on Learners' Learning Motivation?

Among the 36 learners, 31 learners answered the motivation questionnaire. The mean, median, and standard deviations (SD) of the questionnaire scores were calculated, as shown in Table 3. Most values of the mean and median of the three constructs are above four. Thus, it can be deduced that the learners were very motivated while learning using the OEP-based course. The SD values of the three constructs are also low, which indicates that the data points tended to be close to the mean. This implies that the learners shared the same views about this OEP-based course. This is because the OEP-based course shifted the role of learners from being only consumers of the learning content to being active producers of knowledge. This was seen when learners participated in enriching the provided learning materials by the teacher with new materials (different problems that parents face in each age range) that they searched for in teams. In this context, Conole and Ehlers [37] stated that OEP provide innovative ways

of teaching, which can enhance learning outcomes. Additionally, the use of several learning practices, facilitated by technology, allowed the learners to learn and express themselves in the ways they preferred. For example, some learners expressed their opinions in text, while others used audio/video communication mediums provided by the teacher.

Table 3. Descriptive statistics of the three constructs.

	Knowledge Achievement	Engagement	Individual Connection
Mean	4.301	4.269	3.946
Median	4.333	4.333	4
SD	0.634	0.641	0.615

The inter-item correlation matrix between the three constructs (knowledge achievement, engagement, and individual connection) was calculated, as shown in Figure 4. The three constructs were significantly correlated with one another, but with different significance levels (denoted with one or two stars). Particularly, it can be seen that engagement has a higher significant correlation with knowledge achievement and individual connection. This is because, unlike the traditional learning process, the OEP-based course made the learners more active by, for instance, working collaboratively and engaging in social-network learning activities. Consequently, these activities enhanced the learners' engagement and knowledge achievement, as well as their individual connections. For instance, it is seen that 91% of the learners (33 out of 36) added their peers as Wechat friends during the learning process. Moreover, 17 out of 20 learners who have *Tiktok* started following one another. Thus, it can be concluded that the OEP-based course can enhance learners' engagement, individual connections, and knowledge achievements. In this context, Chandra [38] and Al-kaabi [39] stated that collaborative learning can enhance learning achievements. Cronin [5] and Karunanayaka and Naidu [40] further mentioned that OEP could foster collaborative work and innovative practices that might result in better learning outcomes.

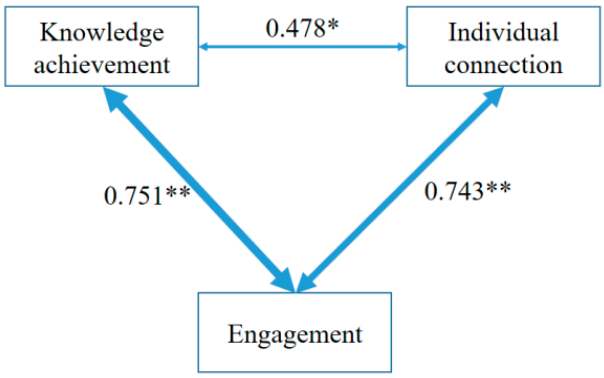

Figure 4. Pearson correlation analysis of the three constructs. Note. * $p < 0.01$, ** $p < 0.001$.

4.2. What Are the Perceptions of Teachers and Learners towards the OEP-Based Course?

As for the advantages and challenges of OEP, most relevant papers have been analyzed from the theoretical perspective of academic research [3,41]. However, this study analyzes the advantages and challenges of OEP from a practical perspective, i.e., after using the OEP-based course. Based on the coding scheme in Table 2, the advantages and challenges of the OEP-based course from two different perspectives—namely, learners and the teacher—are identified and discussed.

4.2.1. Advantages of the OEP-Based Course

The learners mentioned three advantages of the OEP-based course, namely: (1) the course was free and only subject to certain open licensing restrictions. At present, systematic family education courses in the market are too expensive, especially for low-income families; (2) the course fostered interaction among the learners, the teacher, and the learning materials. As one learner said: "As a shy person, I am not brave enough to ask questions. However, with this course I can learn from others' discussions and I can further interact with my colleagues, when needed"; and (3) the learners felt a great sense of achievement during this course. One learner said: "I felt a strong sense of achievement when I heard that the learning materials that I participated in creating were released online, and I immediately shared it with my friends."

The teacher reported two advantages related to teaching using the OEP-based course, namely: (1) the learner-centered practices, which were consistently implemented during the whole teaching process, increased learners' engagement and motivation to learn family education; and (2) the teacher mainly mentioned that she was more of a facilitator, saying, "One of the biggest things that I have learned from this OEP-based course was how to be a facilitator, as this is new to me."

4.2.2. Challenges of the OEP-Based Course

Learners also presented three challenges that they faced while learning using the OEP-based course, namely: (1) six tools with different functionalities were used during this course, including Toutiao, Wechat, Tencent Docs, Tiktok, search engines (e.g., Baidu), and Zoom, and this made learners exhausted and uncomfortable. In this context, one learner stated, "There were so many tools in this course, sometimes I cannot remember which one I should use to learn"; (2) some tools, such as Tencent Docs, were not very friendly on mobile devices, and this made the learning experience inconvenient when mobile devices were used; and (3) more specific activities and learning supports should be designed for shy learners, as they may have difficulty expressing themselves in open learning environments such as social networks.

The teacher also reported several challenges as well while teaching using the OEP-based course, namely: (1) lack of learning platforms that could support multiple functions, such as live courses, open discussion, and collaborative editing of documents at the same time to support the implemented open practices; (2) lack of training for teachers, especially on how to better motivate the learners and facilitate the learning process using the OEP-based course. In this context, the teacher said, "I really hoped that the learners [would] turn on their cameras during the online discussion, so I thought of many ways to encourage them. However, I was not successful, therefore I felt a little frustrated"; and (3) the higher requirements of the OEP-based courses for teaching design, such as making learners active contributors to the learning process and the fear of losing control over the learning process; and (4) major concerns about intellectual property and how she could ensure that others were using her course materials in accordance with the used open license.

As discussed above, despite the fact that OEP have several positive impacts on learning as reported in several studies [5,15,40], several challenges can also be faced during the OEP adoption. These challenges can be: (1) technical, such as lack of tools or the appropriate skills to apply OEP; (2) pedagogical, such as teachers not being familiar with teaching practices that are student-centered; and, (3) personal, such as learners not feeling comfortable in these learning environments, for instance, shy learners (as reported above).

5. Lessons Learned, Limitations, and Conclusions

This study conducted a pilot experiment to design and validate an OEP-based course for teaching "family education." Based on the obtained findings, it can be seen that the OEP-based course has affected positively the learners' motivation level, learning engagement, and learners' individual connection.

Additionally, based on this practical experience, the following recommendations were identified to improve the teaching experience using OEP:

- Both learners and the teacher mentioned that this course was not convenient enough since too many tools were used. Therefore, teachers should pay attention to the number of tools/technologies-enabling practices involved while using OEP.
- Teachers should select more friendly tools for mobile learning, as learners may use their mobile devices during the learning process.
- More training should be provided for teachers on how to: (1) be good facilitators of the learning process while using an OEP-based course, and (2) design diversified engaging learning activities that match the needs of all learners, especially shy learners who may find it difficult to express themselves in open learning environments.
- Building open communities using social networks in OEP-based courses can foster collaborative learning and reduce online social isolation, and hence contribute to enhancing the learning process.
- Intellectual property and privacy protection need more attention for the sustainable development of OEP-based courses. For instance, it is possible to use emerging technologies such as Blockchain to ensure the appropriate use of the published courses.

While this case study reported the adoption of OEP based on five dimensions (OER, open teaching, open assessment, open collaboration and technology-enabling), other researchers might adopt OEP with one or two dimensions (e.g., only apply open teaching). Therefore, the degree of adopting OEP might be seen in terms of the adopted open educational practices, where this adoption can be influenced by someone's personality or culture. While content openness can be measured in terms of the permissions granted to the users of that content [42], it is still difficult to measure the openness in thinking and practices of individuals, and any shifts in them [40]. Therefore, more research should be conducted in order to investigate how the openness degree of OEP can be measured, and if this degree can affect learning outcomes, as this will be crucial in designing OEP-based courses in the future.

Despite the solid ground that this study has given related to the design and validation of OEP-based courses, it has some limitations. For instance, this study used a small sample size (only 36 learners completed this course). The study did not also involve control and experimental groups with pre- and post-assessments. Furthermore, only one validation method (Cronbach's alpha) was conducted to validate the motivation questionnaire. However, despite these limitations, this pilot experiment revealed new insights on how to design an OEP-based course and what should be taken into consideration during the design and teaching of OEP-based courses. Future research directions could focus on: (1) conducting a large-scale sampling experiment with learners from different regions (i.e., different cultures) and investigating the impact of OEP on learners' achievements, and (2) gathering and analyzing the generated online learning process data to improve the learning/teaching process using the OEP-based course.

Author Contributions: X.Z., A.T., R.H., T.C., D.B., J.Y. and J.Z. contributed evenly to this paper. All authors have read and agreed to the published version of the manuscript.

Funding: This research did not receive any funding.

Conflicts of Interest: The authors declare no conflict of interest.

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