Zoom in: Open educational resources for informal online learning during COVID-19 and beyond

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Institutions, organisations, and policymakers use open educational resources (OERs) to promote student equity and social inclusion. The global COVID-19 crisis highlighted the need for lifelong learning and underscored the importance of the higher education system in this endeavour. This study describes informal learning among adults through OERs, during the COVID-19 crisis, distinguishing between employed and unemployed individuals and between professional and personal development. A questionnaire distributed during the COVID-19 lockdown focused on three themes: (1) types of OERs used for learning during this period; (2) perceived OERs' usefulness; and (3) changes in OER use due to the crisis. Our findings revealed group differences in types of OERs used and in changes brought about by COVID-19, as well as within-group differences based on personal characteristics. Only a few participants reported using massive open online courses (MOOCs). Moreover, videoconferencing usage increased despite low perceived usefulness ratings, pointing to a change in informal learning modes. This exploratory research provides insights into the preferences of individual groups. These insights may be used to reduce socioeconomic disparities, especially among those who have lost their jobs, and to develop effective models for open education.

Implications for practice or policy:

- Enhancing the discussions about the future of open education by reflecting a wide picture of OERs use.
- Redesigning OERs for the labour market by distinguishing between employed and unemployed, and professional and personal development.
- OER preferences according to personal characteristics can be used to achieve better engagement with learning.

Keywords: open educational resources (OERs), lifelong learning, open education, informal online learning, learning during COVID-19

Introduction

Several studies highlight the advantages of open education. These include the provision of equal, effective, relevant, and critical education (Lane, 2020; Marín et al., 2022; Wiley, 2021). Institutions, organisations, and policymakers in the field of higher education are working to promote massive open online courses (MOOCs) as a tool for implementing open education (Stagg et al., 2018). This effort seeks to increase participation rates, especially among groups that have traditionally failed to integrate, in higher education (Stagg et al., 2018). Despite these efforts, demographic and socioeconomic variables still influence people's likelihood to participate in online courses (Horrigan, 2016; Lambert, 2020). Moreover, among those who do enrol in MOOCs, dropout rates are high (Alamri et al., 2020; Soffer & Cohen, 2019). The COVID-19 crisis which emerged in early 2020 forced millions of people across the globe to behave differently than usual and to become accustomed to a new routine of social distance restrictions and social isolation. Moreover, a large number of people lost their jobs, creating an urgent need for professional training tailored to this new reality (Organization for Economic Co-operation and Development [OECD], 2020a).

Open education has been noted as promoting the shift from informal to formal learning. For example, open education enables people to try a free online introductory course prior to enrolling in a similar program for credit (Farrow et al., 2015). In addition, in the area of professional development, MOOCs

facilitate informal learning processes by providing employees free access to an unlimited amount of knowledge (Hood et al., 2015).

A meta-analysis by Holland (2019) revealed that only a small portion of the literature is devoted to informal online learning that takes place in everyday life. Specifically, not many studies distinguish between informal learning for professional development purposes (Cerasoli et al., 2018; Jeong et al., 2018; Lejeune et al., 2021) and learning for personal development (Bagdonaite-Stelmokiene & Zydziunaite, 2020; Costa-Sánchez & Guerrero-Pico, 2020), nor do they distinguish between employed and unemployed participants. The aim of this study was to address the discrepancies implied by Holland (2019), which have become more relevant than ever due to the transition to online learning and the rising unemployment rate resulting from the crisis. While the COVID-19 crisis led to a massive shift towards online courses (OECD, 2020a), this study sought to explore informal online learning among adults who are not interested in academic credit or professional certification. The study investigated the use of diverse open education resources (OERs) during the period of social distancing and examined whether this kind of learning changed due to the crisis. OERs are defined as educational materials either licensed under an open copyright license or in the public domain (Wiley et al., 2014), or as first defined by the United Nations Educational, Scientific and Cultural Organization [UNESCO] (2002, p. 24) as "the open provision of educational resources, enabled by information and communication technologies, for consultation, use and adaptation by a community of users for non-commercial purposes". In this study, the term OER refers to any online learning resource that allows free access for everyone. OERs include MOOCs, webinars/videoconferences, podcasts, videos, recorded lectures, papers, books, Wikipedia, social networks, interactive apps, and learning websites. The findings of this study may enhance discussions about the future of open education by reflecting a broader picture of OERs use. Also, by distinguishing between employed and unemployed participants and between professional development and personal development, this study can contribute to redesigning OERs to match the needs of the labour market. Further, to date, very little research has differentiated between groups according to their informal online learning preferences. Our examination of differences according to personal characteristics revealed the OER preferences of each group. This can be used for OER customisation to achieve better engagement with learning. Although our study sample was not large and diverse, in view of the exacerbation of pre-existing socioeconomic and regional disparities due to the crisis, this up-to-date analysis can provide helpful insights for further examination.

Literature review

OERs and changes caused by the COVID-19 pandemic

In order to improve student equity and expand social inclusion, a range of organisations worldwide have begun designing and implementing MOOCs and open education programs. These initiatives offer more equitable educational opportunities and cover a variety of topics useful for all learners, including those preparing to enrol in higher education (Bennett et al., 2016). MOOCs represent a digital milestone in the long history of open education brought about by the rapid growth of the internet and free online resources. Thus, access to education has been increased (Lambert, 2020).

Open education is often commonly discussed in terms of *democratising knowledge* or creating materials that are free for everyone without being bound by fees and/or copyright restrictions (Lambert, 2020). Democratising knowledge incorporates the belief that reusing digital materials is cheaper and easier than creating them from scratch. A wave of investment in OER repositories has allowed teachers to easily find and reuse OER (Mulligan, 2019).

Inequality has remained a persistent issue in higher education despite efforts to eliminate it (Bennett et al., 2016). Therefore, research that investigates student equity and social inclusion continues to be important, for in addition to examining participants who access formal and informal education, it also examines the equality of their experience, progress, and outcomes (Lambert, 2020). Furthermore, during 2020 COVID-19 affected millions of people across the globe. During this period, governments were forced to operate in a context of uncertainty and to face the resultant health, economic, and social challenges.

By the beginning of 2020, more than half the world's population had experienced lockdowns along with strong containment measures. Beyond the health and human tragedy brought on by COVID-19, the pandemic triggered a serious economic crisis (OECD, 2020b). In the context of the crisis, online learning provided continuity when face-to-face instruction was not possible (OECD, 2020a). An example was the increased use of videoconferencing apps during the crisis, especially for ongoing work purposes (Batastini et al., 2020; Lorenz et al., 2020; Vincent-Lancrin et al., 2022).

Online learning effectiveness is usually explored by the volume of access of online courses (Horrigan, 2016; OECD, 2020a). Prior to, and during, the COVID-19 crisis, engagement with, and completion rates of, online courses were often low (Aljarrah et al., 2020; Soffer & Cohen, 2019), especially among those not interested in academic credit or professional certification (Clow, 2013; Holland, 2019). While a great deal of research has focused on improving learning through MOOCs (Lambert, 2020) and on using best practices for course development, few studies have challenged the assumption that online courses are the primary means of providing educational content to online audiences, including those who do not wish to earn academic credits or professional certification (Holland, 2019). In contrast, other modular online formats, such as OER integration according to specific learning demands to construct a new learning process tailored to the needs of different target audiences (Shmueli & Cohen, 2012), have not received sufficient research attention.

Measuring OER use through perceived usefulness

Informal learning is defined as unstructured learning that occurs without the intervention of any institutionalised framework (Ainsworth & Eaton, 2010). This type of learning entails unstructured exposure to an environment in which the individual acquires knowledge, skills, attitudes, and insights through everyday experiences (Coombs & Ahmed, 1974). Informal learning is so deeply ingrained in our daily activities that we often find it difficult to recognise that we are solving problems and developing knowledge (Merriam et al., 2007). Thus, informal online learning encompasses the unstructured learning interwoven into daily life as we access the internet and social media (Dubovi & Tabak, 2020; Jeong et al., 2018).

Informal online learning, the focus of this study, is difficult to measure. Hence, the perceived usefulness of online learning tools can be used as a predictor of actual use. Perceived usefulness is defined as "the degree to which a person believes that using a particular system would enhance his or her job performance" (Davis, 1989). Perceived usefulness is one of the major determinants of attitude toward and intention to use technology. Indeed, behavioural intention to use technology is the main determinant of actual usage (Al-Fraihat et al., 2020). In the e-learning arena, studies have found that students' intentions to adopt e-learning platforms are positively affected by their perceptions of the usefulness of these platforms (Abdullah et al., 2016; Al-Fraihat et al., 2020).

Effects of personal characteristics on online learning

Analyses of the demographics of MOOC users revealed that most are highly qualified professionals (Impey & Formanek, 2021; Lambert, 2020). Millions of non-English speakers were found to adopt MOOCs less than English speakers, for in addition to the language barrier, the cultural perspective was not applicable to their local context (Adam, 2019). In countries in which English is not the native language, English proficiency was also found to be a factor influencing the use of online learning activities other than MOOCs (Cohen et al, 2022). One of the greatest potential strengths of MOOCs is the localisation of OER materials for different global contexts. Yet localisation is also a weakness as it requires a great deal of additional time, resources, and commitment from the producing institutions (Farrow et al., 2015).

The Pew Research Center (Horrigan, 2016) examined adult online learning in the United States with respect to readiness and convenience. According to personal characteristics, the findings pointed to a gap between access to digital technologies and their use for personal or professional learning. Differences were found between levels of technological literacy, academic background, age, and gender. In the context of using the internet for learning, less than half (43%) of those with only a high school education

used the internet for personal learning, compared with 58% of those with college degrees or above. Moreover, only 40% of employed adults in the high school group who pursued professional studies used the internet for these studies, compared with 64% of those in the college group. In addition, a larger percentage of females than males were found to be active learners, though females were not very interested in using technology to continue their studies. In their study, Horrigan (2016) found older participants with relatively low levels of education and technological literacy did not often use the internet for any or all of their learning.

A global study published in 2019 (OECD, 2019) found that on average, only about 40% of adults in OECD countries engaged in formal and non-formal job-related training annually, with a disproportionate number of highly skilled individuals among them. For individuals with low skills, the incidence of adult learning was just over 20%. Moreover, about 28% of adults claimed they did not engage in training due to professional commitments, while another 15% reported a lack of time due to family commitments (OECD, 2020a).

Research goal and questions

This research explored informal online learning through OERs during the COVID-19 crisis among adults over the age of 18 who were not interested in attaining academic credit or professional certification from this learning. The research aims were twofold. First, the research sought a better understanding of this learning while distinguishing between those who were employed and those who were unemployed, and between professional development and personal development. Second, the research sought to examine whether the COVID-19 crisis produced changes in this kind of learning. In light of these research goals and the literature review, we formulated three research questions with regard to employed and unemployed participants.

1. What types of OERs were used for informal online learning during the COVID-19 crisis and have there been any changes as a result of this crisis?
2. Was the use of different OER types compatible with the perceived usefulness of these types for informal online learning during the COVID-19 crisis?
3. How did OER use during the COVID-19 crisis differ between groups with varying personal characteristics with respect to the following factors?
    - Level of technological literacy
    - Academic background
    - Age
    - English proficiency
    - Gender

Research ethics approval was granted by the Institutional Review Board (IRB), approval # 0001198-1, on 24 March 2020.

Method

Research model

To answer the research questions, we designed a quantitative research model (Figure 1) that examined informal open online learning using OERs. The model had three variables: (X1) types of OERs selected by the participants during the COVID-19 crisis; (X2) changes in OER use due to the crisis; and (X3) perceived usefulness of OERs, measured on a scale ranging from 1 (*lowest*) to 10 (*highest*). As noted, informal learning occurs for work purposes as well as for purposes unrelated to work. Thus, the three variables (X1 - X3) were manifested along two paths — personal development and professional development. The relationships between the three variables and each developmental path were examined in terms of six external variables: (A1) technological literacy (on a scale of 1 - 100); (A2) academic background (yes/no); (A3) age; (A4) English proficiency level (low/high); (A5) gender; (A6) employment status due to COVID-19

crisis [employed (EMP1)/lost a job (EMP2)]. Professional development refers to ongoing work-related goals and was therefore irrelevant for the "lost a job" employment status.

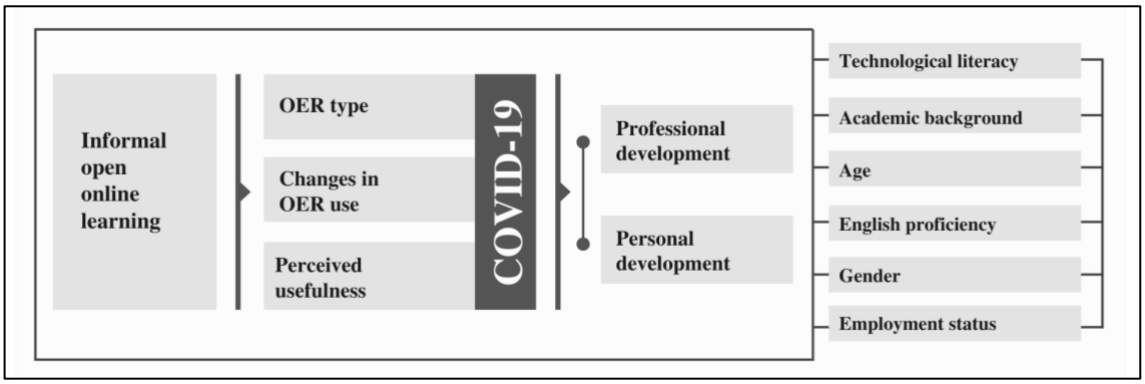

Figure 1. Research model

Research tool

An anonymous questionnaire composed of three parts was used in this study. The questionnaire items were developed through a rigorous process involving a review of the literature and consultation with educational technology research experts, especially OER experts. The first part of the questionnaire collected demographic data including age, academic background, English proficiency level, gender, technological literacy, and employment status due to COVID-19 crisis. This section was based on the Pew Research Center questionnaire (Horrigan, 2016), which examined American adults' use of digital tools for learning. The second part of the questionnaire examined informal online learning through perceived usefulness ratings of a closed list of OER types, on a scale of 1 to 10. This part of the questionnaire was based on various studies showing that technology adoption is positively affected by its perceived usefulness, especially among learners (Abdullah et al., 2016; Al-Fraihat et al., 2020). The list of OER types in this section was based on a research survey that investigated media usage patterns and provided insight into the use of formal and informal media and learning environments (Zawacki-Richter et al., 2015), where participants were asked to consider only free resources. This list of OER types was then refined by the project team and experts.

To provide a more accurate picture of unique informal online learning taking place during the COVID-19 era, we constructed the third part of the questionnaire in the form of two open-ended questions: (1) to identify the OER types, we first asked participants to describe a good learning experience through OERs during the crisis, and (2) we asked participants to describe how their use of OERs changed during the crisis. Those in the employed group were required to answer this section twice, once for personal development and once for professional development. The OER types were coded and added to the OER types list. Reliability analysis was conducted and revealed high Cronbach's alpha (0.949).

A final draft of the questionnaire was shared with local and international experts to ascertain whether there was any pertinent content that may have been missed. Once experts' suggestions were incorporated, an online version of the questionnaire was tested for content validity using a pilot group of six participants. To eliminate associations with any formal educational frameworks and in view of the social distance restrictions enforced at the time of the study especially following COVID-19 lockdown, we decided, like many other researchers (e.g. Kaisara & Bwalya, 2021; Krishnapatria, 2020), to distribute the questionnaire online via individual and institutional social networks (Facebook, LinkedIn, and WhatsApp). The questionnaire was accessible in Hebrew and English and available for answering from mid-April to early May 2020.

Research sample

A total of 141 respondents completed the questionnaire: 87% identified themselves as Israelis, while 7% stated they were residents of other countries (Australia, Austria, Ireland, England, USA, Belgium, Germany, Poland), and 6% didn't identified themselves. Of the study sample, 67% remained employed during the COVID-19 crisis, while 22% lost their jobs due to the crisis. Some participants (11%) indicated that they were unemployed prior to the crisis. COVID-19 social distancing restrictions led to laying off workers in sectors that were not allowed by governments to remain open and with employees who were unable to perform their jobs from home. These jobs are historically concentrated in low-income areas, tend to be low paid and less secure, and are disproportionately filled by young, poorly educated workers, and migrants (Couch et al., 2020; Sanchez et al., 2020). Our focus in this research was on improving equity and social inclusion by means of adequate open online training. Therefore, the participants who were unemployed prior the crisis were not included in the final sample for analysis. Most of the respondents were young females (under 40) with an academic education and a high level of English proficiency and technological literacy. No significant differences in gender, age, academic background, English proficiency level or technological literacy were found between participants who lost their jobs and employed participants (Table 1).

Table 1
Sample demographics

		Employed (*n* = 94)	Lost their job due to COVID-19 crisis (*n* = 31)	Total (*N* = 125)	χ2
Gender	Female	63.5%	77.4%	66.9%	2.053
	Male	36.5%	22.6%	33.1%	
Age group	18 - 29	38.7%	35.5%	37.9%	0.132
	30 - 39	34.4%	35.5%	34.7%	
	40 - 55	17.2%	19.4%	17.7%	
	56 - 72	9.7%	9.7%	9.7%	
Academic background	Yes	92.5%	90.3%	91.9%	0.145
	No	7.5%	9.7%	8.1%	
English proficiency level	Low	20.4%	32.3%	23.4%	1.815
	High	79.6%	67.7%	76.6%	
Technological literacy	Low	19.4%	22.6%	20.2%	0.158
	Medium	46.2%	45.2%	46.0%	
	High	34.4%	32.3%	33.9%	

Note. $p > .001$

Data analysis

The quantitative analysis of the data included frequencies of: (a) different types of OERs, (b) changes in OER use, and (c) perceived usefulness ratings for each group (employed and unemployed, professional and personal development) and then according to personal characteristics of technological literacy, academic background, age, English proficiency, and gender. In this way, we sought to examine the types of OERs the study participants chose to use, the significant changes following this period, whether there was consistency between actual use and perceived usefulness ratings, and whether there were differences according to personal characteristics. In addition, *T*-test analyses were performed to compare between employed and unemployed, and between personal development and professional development

among employed, as well as ANOVA tests and two multiple regression analyses to examine the effect of personal characteristics on perceived usefulness (personal and professional development).

Findings

OER use during the COVID-19 crisis and the resultant changes

Types of OERs used during the COVID-19 crisis
First, participants were asked to describe a good learning experience through OERs during the crisis. More specifically, they were asked to describe the types of OERs they used for informal learning during the COVID-19 crisis. All findings are described below according to employment status. Those in the employed group were required to answer separately regarding professional and personal development.

Among the employed participants, videos were the leading category for personal development (38.2%), with only 18% stating they used online courses for personal development (Figure 2). For professional development, the leading category was webinars/videoconferences (32.4%). Additionally, a large proportion of the employed participants chose the category "no OERs were used" for professional development (35.1%). Similar to the findings for personal development, only 13% indicated they used online courses for professional development.

Among participants who lost their jobs due to the crisis, the most reported OER types used during the given period were webinars/videoconferences (33.3%) and videos (27.8%). Only 11% indicated using online courses (Figure 2).

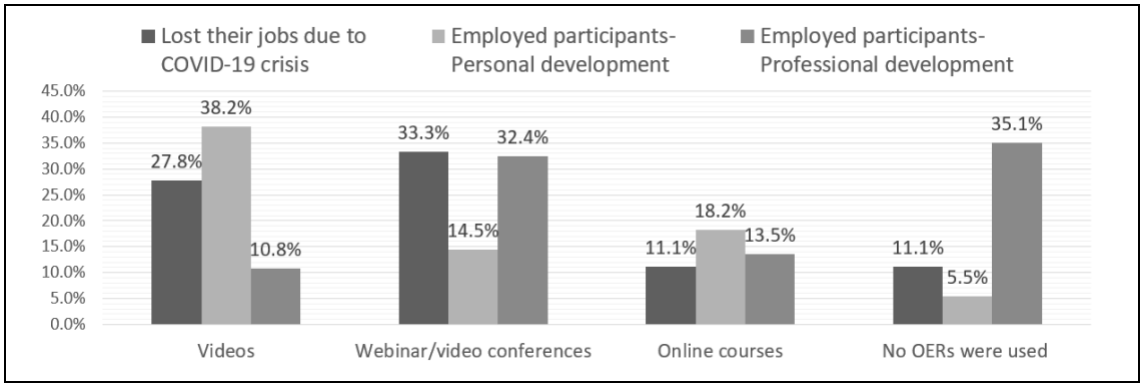

Figure 2. Top types of OERs used during the COVID-19 crisis, by employment status and development path

Changes in OER use due to the COVID-19 crisis
The participants were asked to describe changes in their OER use due to the COVID-19 crisis. For the employed participants, the significant change in the context of personal development was "OER use has increased" (45.2%). For professional development, in contrast, most reported "no change in activity patterns" (44.4%). In addition, the category "use of videoconferencing applications has increased" was chosen more widely among the employed participants for professional development. Among participants who lost their jobs due to the crisis, the significant change was "OER use has increased" (50%). In addition, the category of "social network use for learning has increased" appeared to a greater extent among those who lost their jobs (Figure 3).

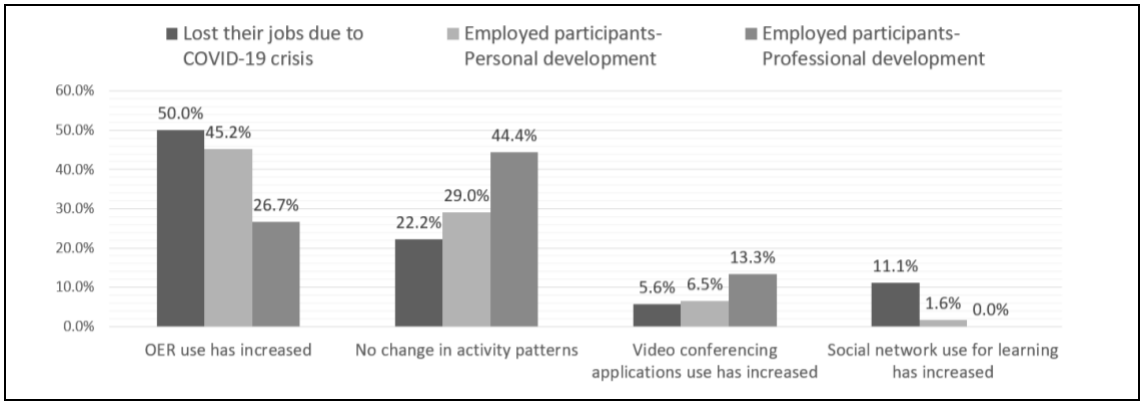

Figure 3. Top changes in OER use during the COVID-19 crisis, by employment status and development path

Usage versus perception: Types and perceived usefulness of OERs used during the COVID-19 crisis

To examine the consistency between actual use of a particular OER type and its perceived usefulness, we asked the participants to rate their perceived usefulness to informal learning of a selected list of OER types. As in the previous question, employed people were required to answer twice, once for personal development and once for professional development. Responses to this question yielded a list of selected OER types classified according to their average perceived usefulness rating (24 categories). Among those who remained employed, videos received the highest average rating, both for professional and personal development, even though significant difference was found between them ($t_{(88)} = 4.02$, $p < .001$) (Figure 4). This finding was consistent with participants' responses regarding actual use. Furthermore, among the employed participants, webinars were ranked 18th for professional development and 19th for personal development, while videoconferences were ranked 6th for professional development and 13th for personal development. This finding was inconsistent with participants' responses regarding actual use, in that a large percentage of participants claimed to have used this type of resources. Furthermore, among the employed participants, no significant difference in ranking order emerged between professional and personal development. Another interesting finding regarding employees was that the average perceived usefulness rating of all resources rated significantly ($t_{(91)} = 2.770$, $p < .01$) higher for personal development ($M = 4.59$, $SD = 2.30$) than for professional development ($M = 4.05$, $SD = 2.67$), as evidenced by the high frequency of the statement "no OERs were used" for professional development (35.1%).

Similar results in terms of consistency were found among participants who lost their jobs. The OER type with the highest average rating was videos, with webinars ranked 19th and videoconferences ranked 11th. In addition, Wikipedia was ranked second, followed by online newspapers and social networks. Moreover, those who lost their jobs ranked videos and posts shared on social networks significantly ($t_{(123)} = 2.01$, $p < .001$; $t_{(123)} = 2.361$, $p < .05$) higher ($M = 6.3$, $SD = 3.23$; $M = 6.32$, $SD = 3.26$) than those who retained their jobs ($M = 5.0$, $SD = 3.52$; $M = 4.61$, $SD = 3.59$). This is consistent with the high frequency of the statement "social network use for learning has increased" among the unemployed (Figure 3).

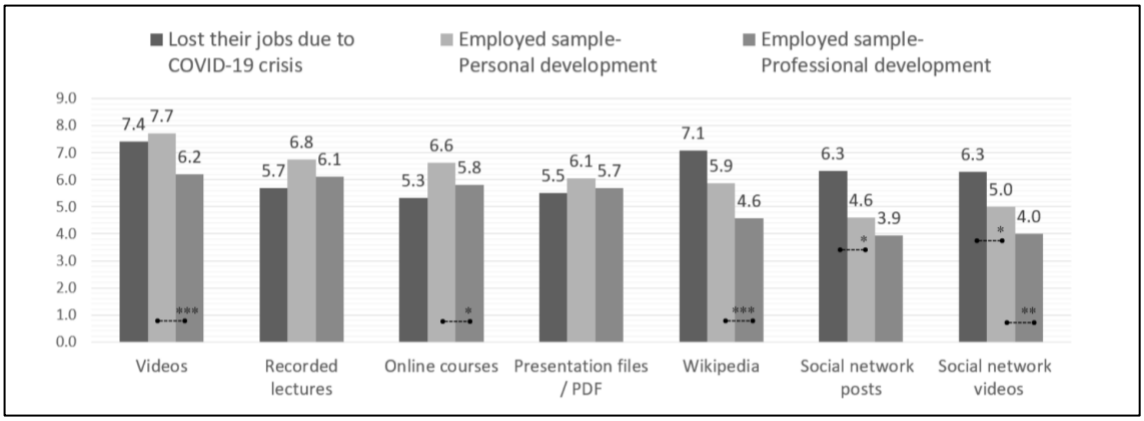

Figure 4. Top OER categories by average perceived usefulness rating, by employment status, and development path
Note. *p < .05, **p < .01, **p <. 001

Differences in OER use during the COVID-19 crisis according to personal characteristics

Differences in levels of technological literacy
ANOVA analysis was performed to determine whether the differences in perceived usefulness among individuals with different technological literacy were significant. The analysis yielded significant differences (F(103) =10.88, p < .001). Tukey HSD post hoc comparisons indicated that the differences were significant between three groups with different levels of technological literacy: low, medium, and high (p < .001), except for the medium and high groups. The analysis showed that the higher the level of technological literacy, the higher the perceived usefulness mean (M = 2.37, SD = 1.80, M = 4.36, SD = 2.12, M = 4.97, SD = 2.40). With regards to personal and professional development the ANOVA analysis yielded significant differences betweem the groups as well: F(138) = 10.82, p < .001; F(103) = 6.902, p < .005. In both, personal and professional development, like in PU, Tukey HSD post hoc comparisons indicated that the differences are significant between all three groups (p < .001), except between the medium and high groups.

In addition, regrading personal development, among the employed participants and among participants who lost their jobs due to the crisis, the category “no OERs were used” appeared more frequently among those with low technology literacy. In contrast, for professional development (employed participants) the category “no OERs were used” was mentioned to a large extent even among those with high technology literacy. In addition, for personal development among the employed participants, only participants with low technological literacy specified that their “use of social networks for learning has increased”. Participants who lost their jobs due to the crisis pointed to “OER use has increased” (50%) as the significant change, especially among those with high technological literacy. In addition, the category “use of social networks for learning has increased” appeared to a greater extent among participants who lost their jobs with low technological literacy.

Two multiple linear regressions were calculated to predict average perceived usefulness rating of all OERs with regard to personal and professional development, based on technological literacy, academic background, age, English proficiency, and gender. In terms of both personal and professional development, significant regression equations were found: F(5,134) = 5.36, p < .001, R^2 = 0.167; F(5,99) = 5.89, p < .001), R^2 = 0.23. Technological literacy was found to be significant predictor of average perceived usefulness ranking for personal development (p < 0.001) as well as professional development (p < 0.005). According to the regression analyses, the average perceived usefulness rating of all OER types increased with the level of technological literacy (Figure 5): Personal development - $F_{(5,134)}$ = 5.367, p < 0.001, R^2 = 0.167; professional development - $F_{(5,99)}$ = 5.899, p < 0.001, R^2 = 0.23.

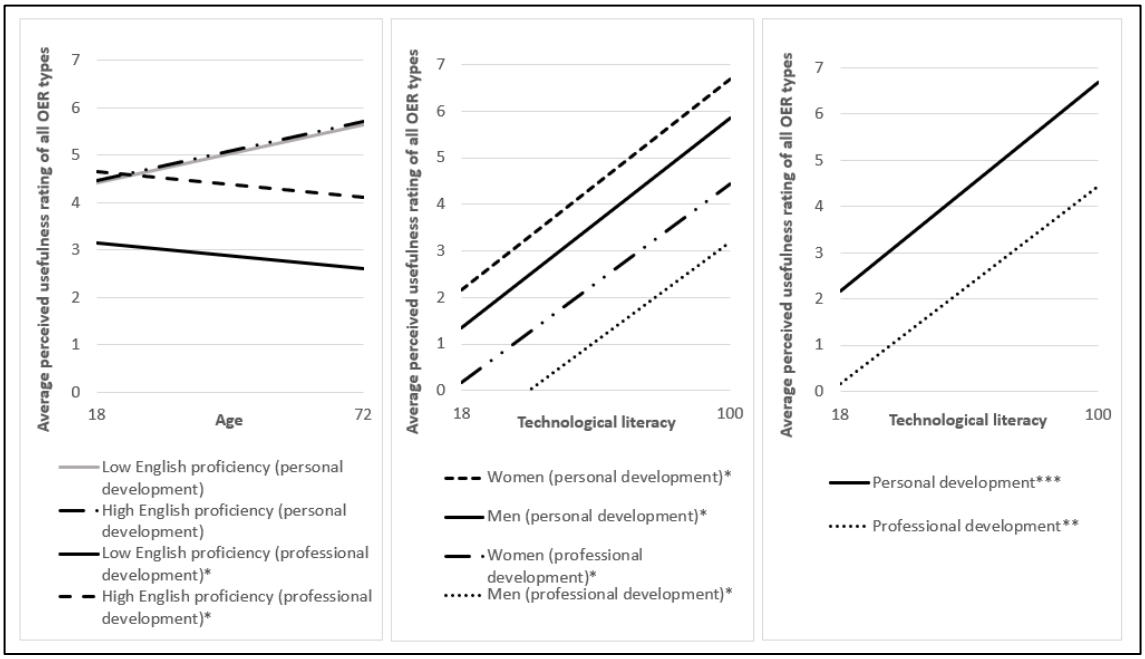

Figure 5. Regression for average perceived usefulness (personal and professional development) of all OER types. *p < .05, **p < .01, ***p < .001

Differences in participants academic backgrounds

T-test analysis was performed to determine whether the differences in perceived usefulness between participants with and without academic background were significant. Significant differences were found between the two groups ($t_{(104)}$ = 2.25, p < .05). In addition, there were significant differences for personal development ($t_{(139)}$ = 2.01, p < .05) and professional development ($t_{(104)}$= 3.08, p<.005). In all cases, those with academic backgrounds rated OERs' usefulness higher (PU: *M* = 4.25, *SD* = 2.33, *M* = 2.34, *SD* =1.65; Personal development: *M* = 4.72, *SD* = 2.26, *M* = 3.33, *SD* = 2.60; PrD: *M* = 3.93, *SD* = 2.72, *M* = 2.04, *SD* = 1.54).

Also, in the context of personal development, the category "no OERs were used" appeared more frequently among those without academic backgrounds. In contrast, in the context of professional development, the category "no OERs were used" was more often the chosen response, even among participants with academic backgrounds. Furthermore, in the context of personal development, all the employed participants without academic backgrounds reported "no change in activity patterns".

Age group differences

ANOVA analysis was performed to determine whether the differences between responses of participants in different age groups in perceived usefulness were significant. The analysis yielded significant differences between the four age groups: (F(102) = 6.466, p < .001. Tukey HSD post hoc comparisons indicated that the perceived usefulness mean of age group 4 (56 - 72) was significantly lower than group 1 (18 - 29), 2 (30 - 39) and 3 (40 - 55): p < .005, p < .05, and p < .005, respectively; *M* = 1.65, *SD* = 1.64, *M* = 4.55, *SD* = 2.46, *M* = 3.76, *SD* = 2.03, and *M* = 5.15, *SD* = 1.93. Notably, the youngest participants (group 1) rated OERs' usefulness significantly higher than the oldest (p < .005; *M* = 4.55, *SD* = 2.46, and *M* = 1.65, *SD* = 1.64). However, group 3 (40 -55) had the highest average perceived usefulness ranking (*M* = 5.15, *SD* = 1.93).

With regards to personal and professional development the ANOVA analysis yielded significant differences among the age groups as well: F(137) = 3.38, p < .05; F(102) = 6.387, p < .005. Again, with regard to personal development as well as in the professional development, group 3 had the highest ranking. Tukey HSD post hoc comparisons indicated that with regards to personal development, the significant differences resulted from groups 3 and 4 (p < .05; *M* = 5.54, *SD* = 1.96, and *M* = 3.28, *SD* = 2.92),

while with regards to professional development, the significant differences resulted from groups 1 and 4 ($p < .005$; $M = 4.51$, $SD = 2.88$, and $M = 1.09$, $SD = 1.40$) as well as from groups 3 and 4 ($p < .005$; $M = 4.70$, $SD = 2.39$, and $M = 1.09$, $SD = 1.40$).

For personal development among the employed participants and among those who lost their jobs due to the crisis, older participants (56 - 72) chose the category "no OERs were used" more frequently. In contrast, for professional development in the employed group, the category "no OERs were used" appeared to a large extent even among the youngest age group (18 – 29). In addition, among the employed participants in the context of personal development, only the older age group (56 - 72) particularly specified that their "use of social networks for learning has increased". For professional development, the category "no change in activity patterns" appeared more frequently among the older age group (56 - 72) than the youngest age group (18 - 29).

Differences in levels of English proficiency

T-test analysis was performed to determine whether the differences in perceived usefulness between participants with low and high levels of English proficiency were significant. Significant differences were found between the two ($t_{(104)} = 3.43$, $p < .001$). In addition, there were significant differences for personal development ($t_{(139)} = 1.75$, $p < .05$) and professional development ($t_{(104)} = 3.18$, $p < .005$). In all cases, those with a high level of English proficiency rated OERs' usefulness significantly higher (PU: $M = 4.48$, $SD = 2.30$, and $M = 2.65$, $SD = 1.90$; Personal development: $M = 4.80$, $SD = 2.28$, and $M = 4.02$, $SD = 2.35$; PrD: $M = 4.19$, $SD = 2.70$, and $M = 2.22$, $SD = 2.07$). For personal development among the employed participants and those who their jobs due to the crisis, the category "no OERs were used" was chosen more frequently by people with low English proficiency. In contrast, for professional development in the employed group, the category "no OERs were used" was prevalent even among a large percentage of those with high English proficiency.

Among the employed participants, for personal development, only participants with low English proficiency explicitly specified that their "use of social networks for learning has increased." For professional development, the category "no change in activity patterns" was chosen more frequently by those with low English proficiency. Among those who lost their jobs, the category "use of social networks for learning has increased" was chosen to a greater extent byparticpants with low English proficiency than those with high English proficiency.

In terms of professional development, a multiple linear regression was calculated to predict average perceived usefulness rating of all OERs based on technological literacy, academic background, age, English proficiency, and gender. A significant regression equation was found: $F(5,99) = 5.89$, $p < .001$), $R^2 = 0.23$. English proficiency was found to be significant predictor of average perceived usefulness ranking ($p < 0.05$). Based on the regression analysis, those with high levels of English proficiency rated OERs' usefulness higher than those with low proficiency (Figure 5).

Gender differences

T-test analysis was performed to determine whether the differences between genders in perceptions of perceived usefulness were significant. No significant differences were found between the two, however there were significant differences for personal development ($t_{(138)} = 1.835$, $p < .05$) and professional development ($t_{(103)} = 1.850$, $p < .05$). Females' perceived usefulness for the benefit of personal development ($M = 4.85$, $SD = 2.37$) as well as professional development ($M = 4.13$, $SD = 2.84$) were higher than males' ($M = 4.08$, $SD = 2.16$, and $M = 3.12$, $SD = 2.32$). In addition, from the two multiple linear regressions reported above, gender was found to be significant predictor of average perceived usefulness ranking for personal development ($p < 0.05$) as well as professional development ($p < 0.05$). The regression analysis indicated females rate OERs' usefulness higher than males rate the usefulness (Figure 5). Table 2 summarises the main findings regarding all the research questions.

Table 2
Summary of main findings

Lost their jobs due to COVID-19 crisis	Employed participants	
Personal development	Personal development	Professional development
Types of OERs selected for use during the COVID-19 crisis		
High frequency: Webinar/video conference and video	High frequency: Videos	High frequency: Webinar/video conference
"No OERs were used" appeared more frequently among people with low technology literacy, older age group (56 - 72), low English proficiency and without academic backgrounds.		"No OERs were used" appeared to a large extent, including among people with high technology literacy, younger age group (18 - 29), high English proficiency and academic backgrounds.
Changes in OER use due to COVID-19		
High frequency: "OER use has increased", especially among participants with high technological literacy. Participants without academic backgrounds only reported "No change". Participants with low technological literacy chose "use of social networks for learning has increased" to a greater extent than the employed participants.	High frequency: "OER use has increased"	High frequency: "No change" More than other participants, these participants reported an increase in use of video conference apps for learning.
Perceived usefulness of selected OERs		
Highest average rating: Videos' Perceived usefulness ratings of social networks are significantly higher than those for employed.	Highest average rating: Videos	Highest average rating: Videos' Perceived usefulness rating of all OER types is significantly lower than that for personal development.
		English proficiency is a significant predictor of PU: those with a high-level rated perceived usefulness significantly higher than those with a low level.
Technological literacy is a significant predictor of PU: perceived usefulness ranking increases with literacy. Gender is a significant predictor of PU: Females rated perceived usefulness significantly higher than males. Participants with academic backgrounds rated perceived usefulness significantly higher than those without. Perceived usefulness was rated significantly lower by older participants.		

Lost their jobs due to COVID-19 crisis	Employed participants	
Personal development	Personal development	Professional development
Participants with a high-level of English proficiency rated perceived usefulness significantly higher than those with a low level.		

Discussion

OER use during the COVID-19 crisis and the consequent changes

Instructional videos have been popular for formal and informal learning. For the participants of this study, the COVID-19 crisis led to an increase in OER use for informal online learning. This was especially the case for videos regarding personal development. This finding is in line with previous studies indicating that instructional videos are more attractive for learning than written materials (Liao et al., 2019). Studies comparing the use of OERs for professional versus personal development in informal online learning are scarce. According to this study sample, webinars/videoconferencing apps were mainly used for professional development and cited as a good learning experience by 32.4% of participants. This finding supports other research showing that the use of these apps increased due to the crisis, especially for ongoing work purposes (Lorenz et al., 2020; Vincent-Lancrin et al., 2022). The participants in this study reported that the use of these applications changed the way they used informal online learning. Nevertheless, it remains to be seen whether this activity will, or even should, continue after social distance restrictions are removed.

Usage versus perception: OER types used during the COVID-19 crisis and their perceived usefulness

Technological perceived usefulness is associated with its actual usage (Abdullah et al., 2016; Al-Fraihat et al., 2020). However, although videoconferencing applications were rated low in terms of PU, participants used these resources extensively, especially for professional development. This finding was supported by the fact that the perceived usefulness ratings of these applications during the crisis were low among those who had never used them before (Batastini et al., 2020). Notably, among all participants, both employees and those who lost their jobs, the average perceived usefulness ratings of webinars/videoconferencing apps were not high relative to those of other resources, especially videos, which were rated the highest.

Further, previous studies pointed to low adoption of online learning for professional development (OECD, 2020a). As an indicator for actual use, the average perceived usefulness ranking of all OER types listed for personal development was found to be higher than that for professional development. This is backed up by the finding that a large percentage of employees did not use OERs at all for professional development during the COVID-19 crisis. Thus, it is important to understand how workplaces can deal with obstacles in OER adoption, knowing that the same people use it for personal needs but not professional needs.

Pre-crisis studies reported that individuals with low technological literacy rarely used online learning (Horrigan, 2016; OECD, 2020a). In our sample, social networks were ranked higher among those who lost their job during COVID-19 than those who remained employed. Also, when asked about changes in their OER usage during the crisis, these participants reported increased learning via social networks. In light of this, it may be concluded that social networks, perhaps more than other OERs, are a suitable and attractive platform for unemployed people with low technological literacy. Therefore, taking advantage of social networks for their development may be worthwhile.

Differences in OER use during the COVID-19 crisis according to personal characteristics

Individuals with high technological literacy usually utilise online learning more frequently (Horrigan, 2016). Moreover, no significant difference was found between genders, and no distinction was drawn

between personal and professional development using informal learning (Holland, 2019; Horrigan, 2016). From our research, technological literacy and gender were found to be significant predictors of OER's perceived usefulness in personal and professional development. When literacy increased, the perceived usefulness rating increases, with the ranking for females significantly higher than for males.

In line with the existing research which found that learning resources with local characteristics influence their adoption (Adam, 2019; Cohen et al, 2022; Farrow et al., 2015), English proficiency was also found to be a significant predictor of OER's perceived usefulness for professional development. Participants with high English proficiency tended to rate OERs' perceived usefulness higher. Thus, it may be necessary to determine whether work-related learning resources are inadequately adapted for those with lower English proficiency. In addition, previous studies examined adults' digital readiness for online learning and found that online learning preferences vary according to academic background, age, and English proficiency (Cohen et al, 2022; Horrigan, 2016). In this study, significant differences were observed between individuals with academic backgrounds and individuals without academic backgrounds, the oldest and youngest groups, and between participants with high and low levels of English proficiency. These differences indicated that OERs' perceived usefulness rates are lower for individuals without academic backgrounds, older participants, and participants with low English literacy. Since these characteristics were not significant predictors of perceived usefulness for personal and professional development, further research under informal open online learning settings may be worthwhile.

Limitations and future directions

Since this study was limited to dissemination via social networks, the research sample was not large and probably did not accurately represent the whole population. Moreover, this study focuses on perceived usefulness of OER types regardless of what they learned. Thus, we recommend examining these issues with other audiences and over time to get a fuller picture. In addition, a large percentage of participants with high digital skills reported low adoption of OERs for professional development. Future research could explore this topic, especially since informal online learning plays a significant role in supporting lifelong learning (Dubovi & Tabak, 2020; Holland, 2019; Jeong et al., 2018).

Conclusion

This study presented a unique picture of informal online learning through OERs during the COVID-19 crisis among online users who are not interested in academic credit or professional certification. Institutions and organisations around the world actively work to promote student equity and social inclusion through open education. Most efforts are focused on creating and distributing MOOCs. However, in answering the first research question about using different types of OERs during the COVID-19 crisis low usage rates of MOOCs for informal learning were revealed, while videos are highly popular. Given these findings, using other popular OERs to reach target audiences according to their preferences is worth considering.

In addition, the second research question focused on the compatibility between the use of different types of OERs and their perceived usefulness for this specific type of learning. According to the findings, perceived usefulness was a great predictor of informal open online learning. The third research question delved into the impact of personal characteristics. This study revealed that different types of OERs are used depending on personal characteristics, as well as based on differences between employed and unemployed groups, and between professional and personal development. Given these findings, we recommend that policymakers consider the issue of OER personalisation.

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