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# Shaping the future of distance learning in teacher education: MOOCS during COVID-19

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## Abstract

*The current research aimed to investigate the perceptions of pre-service students regarding the usefulness and contribution of Massive Open Online Courses (MOOCs) in initial teacher education programmes, particularly in times of emergency. Participants comprised 202 second-career pre-service students who enrolled in alternative teacher education programmes during COVID-19. On average, students studied 4–5 courses that were a mandatory component of their programme. Students completed an anonymous, voluntary, self-report questionnaire at the end of their studies. Findings show that students found the MOOCs to be a good teaching model. They were satisfied with their MOOC studies and reported their learning experience to be significantly more rewarding and positive than lonely and stressful. Learning outcomes were ranked high. In terms of the usefulness and contribution of the MOOCs, three student profiles were identified. The “zealous” type is enthralled by the merits of MOOCs including their impact on their future teaching, professional development and lifelong learning. The “guarded” type perceives only some of the MOOCs’ attributes as positive, primarily convenience, independent learning and studying a variety of courses with well-known experts. The “pragmatic” type is highly opportunistic and utilitarian, perceiving MOOCs only as a means to overcoming barriers of time and place. Finally, students who study more MOOCs perceive them as having a positive impact on their future teaching, acknowledge their importance in times of crisis and opt for including a higher proportion of MOOCs in initial teacher education programmes. The favourable impact of studying several MOOCs as part of an initial teacher education programme is one of the main findings of the current research highlighting the importance of students experiencing several such courses during their pre-service studies.*

**Keywords:** MOOCs; distance learning; pre-service teachers; initial teacher education; COVID-19; education policy.

## 1. Introduction

The lockdowns of the COVID-19 pandemic required all higher education (HE) institutions in Israel to switch to distance learning. While online learning was by no means a new phenomenon, online teaching and learning comprised a fraction of the curriculum in teacher education programmes (Aharony & Bronstein, 2014). Under the

emergency circumstances of the pandemic, Massive Online Open Courses (MOOCs) became an ad-hoc solution for the difficulty some teacher educators encountered while teaching online. Offered free by experts in some of the top ranked HE institutions, and allowing flexibility in terms of time, space and pace of learning, MOOCs seemed an ideal response given the state of emergency.

The demand for MOOCs further increased with the launching of ad-hoc alternative initial teacher education (ITE) programmes aimed at recruiting postgraduates who had lost their jobs because of the Coronavirus crisis. These programmes offered accelerated online teacher training programmes to hundreds of unemployed academics nationwide to partially resolve the massive chronic shortage of teachers (Ramot & Donitsa-Schmidt, 2021). Immediately after the Ministry of Education (MoE) launched the first programme in May 2020, additional programmes followed, attracting hundreds of candidates who considered teaching an attractive profession during the ongoing economic disaster. The curricula designed for these students included several MOOCs due to the inability to recruit faculty members able and willing to teach so many online courses.

Previous research has already shown that MOOCs hold great potential for HE (Wang & Zhu, 2019), and could serve as an effective tool for ITE (Montgomery *et al.*, 2015; Nortvig & Gynther, 2017) and for the professional development of in-service teachers (Vivian, Falkner & Falkner, 2014). Yet, certain types of knowledge and skill acquisition have been acknowledged as lending themselves better to MOOCs than others in terms of efficiency and effectiveness (Fyle, 2013). Fyle concluded that MOOCs best addressed the acquisition of content knowledge whereas assessment, feedback and practical in-classroom skills required in teaching were deemed to be less suited to MOOCs. Despite the positive results of MOOC integration in ITE, little research has explored to date the inclusion of several mandatory MOOCs as part of ITE programmes.

The purpose of the current research was to investigate the perceptions of pre-service second-career students regarding the usefulness and contribution of MOOCs in ITE programmes in general and in times of emergency such as COVID-19 in particular. Looking to the future of teacher education, students' views on MOOCs promise to shed light on the degree to which these courses cater to their needs as future teachers. This paper contributes to the current debate on teaching and learning in future teacher education programmes and the degree of open distance education incorporation in a changing educational landscape (Carrilo & Flores, 2020; Rice & Deschaine, 2020).

## 2. Massive open online courses

MOOCs are university courses that have migrated from the closed, limited audience physical classroom setting to online courses open to an almost unlimited number of participants and have gained popularity since 2013 (Scholz, 2013). HE institutions offer MOOCs free of charge via the internet and partnerships with external providers such as Coursera and edX (Shah, 2020). They are among the main types of open educational resources (OERs), i.e., digitised materials offered freely and openly for all to use and re-use for teaching, learning and research (OECD, 2007; UNESCO, 2002).

Among the numerous acknowledged advantages of MOOCs, they have been noted to be efficient tools for democratising learning by providing quality education for all (Dillahunt, Wang & Teasley 2014), internationalising HE (Schuwer *et al.*, 2015), developing digital competence

(Aljarrah, Ababneh & Cavus, 2020), increasing self-regulated learning strategies (Zhu, Bonk & Sari, 2018), promoting ongoing professional development and endorsing lifelong learning (Vivian *et al.*, 2014).

From the learners' perspective, MOOCs allow flexibility and convenience while breaking the boundaries of time, space and learning pace, and overcoming barriers such as scheduling and location (Shapiro *et al.*, 2017). MOOCs also offer an opportunity to study a wide array of subjects with worldwide experts in prestigious HE institutions, experience online social interactions and enjoy the learning process without pressure of completion or accreditation (Hew & Cheung, 2014; Koller *et al.*, 2013).

Despite their popularity, there is evidence that most MOOC participants do not complete the course (Goopio & Cheung, 2021). Several studies examined student behaviour profiles in MOOCs platforms (Kahan, Soffer & Nachmias, 2017; Khalil & Ebner, 2017; Poellhuber, Roy & Bouchoucha, 2019). While they identified students who were "perfect students", "online engagers" or "active-independent", they noted that most of the students were "dropouts", "tasters" and "disengagers". Among the reasons for the high dropout rate and disengagement were lack of individual interaction or attention from the teacher and failure to understand the content or have anyone to turn to for help (Hone & El Said, 2016). Given their massive proportions, MOOCs provide little or no instructional support beyond the videos and course material posted by the instructors. Baek and Shore (2016) indicated that greater interaction reduces students' dropout rate and enhances student performance. Additional reasons for dropping out are lack of incentive and no financial consequences (Chiu & Hew, 2018; North, Richardson & North, 2014). On the other hand, studies have shown that the perceived usefulness of the courses and users' overall satisfaction increase the motivation to continue using MOOCs (Alraimi, Zo & Ciganek, 2015; Zhou, 2016). Applying the Biggs model of teaching and learning (Biggs, 2003) has revealed that MOOC features such as pedagogy, tools, duration, feedback and assessment directly affect students' learning experience, whether positive or negative, and thus students' learning outcomes (Pilli & Admiraal, 2017).

### 3. MOOCs in teacher education programmes

Teacher education programmes are a particular HE sphere. The management and faculty of institutions training future teachers devote considerable attention to serving as models for the soon-to-become teachers, placing much emphasis on the medium of instruction. The instructors and courses must therefore meet high expectations in terms of content and pedagogical strategies as they are likely to influence students' motivations and learning outcomes (Biggs, 2003). In addition to expanding students' content knowledge (CK), ITE courses should also offer other types of knowledge required in teaching, such as pedagogical content knowledge (PCK) and technological and pedagogical content knowledge (TPACK). PCK stands for the understanding, skills and dispositions of a certain discipline and includes the ability to transform CK into valuable representations, instruction modes and evaluation procedures (Shulman, 1987). TPACK is a technology integration framework that includes technological, pedagogical and content knowledge (Mishra & Koehler, 2006). Before including a ready-made MOOC in ITE programmes, it is necessary to verify that its instructional and organisational design meet the required quality criteria (Margaryan, Bianco & Littlejohn, 2015). In their current design, MOOCs seem to lend themselves well to CK acquisition. However, it has been suggested that their assessment criteria and peer evaluation need to be redesigned to include components that would allow teacher-educators to monitor the quality of products

developed and constructed (Fyle, 2013). Furthermore, to meet the need for social interaction, MOOCs should also include more sophisticated interactive features that could support social-constructivist learning (Fyle, 2013).

While MOOCs have been researched extensively in the past few years, research of the usage of MOOCs in ITE has been rather scant. The few research studies that have investigated MOOC usage in ITE were limited in scope. They examined issues such as participation in individual MOOCs (Gómez-Galán *et al.*, 2020; Orsini-Jones & Cerveró Carrascosa, 2019), MOOCs developed especially for the ITE programme (Gonçalves *et al.*, 2016) or MOOCs that were an optional part of students' curriculum (Donitsa-Schmidt & Topaz, 2018). Other studies examined the use of MOOCs in ITE mixed designs rather than as stand-alone components (Orsini-Jones & Cerveró Carrascosa, 2019; Montgomery *et al.*, 2015; Nortvig & Gyntner, 2017). Thus, despite the positive results and overall satisfaction that emerges from these studies, indicating the favourable potential of MOOCs for ITE, there is a need to explore further the inclusion of several stand-alone MOOCs as mandatory and integral parts of an ITE programme. The current study aims to fill this gap.

#### 4. MOOCs during the COVID-19 pandemic

The COVID-19 pandemic caught everyone off guard and obligated all HE institutions to switch to an online mode of teaching and learning. MOOCs thus became a viable solution for many, leading to a dramatic increase in market demand, enrolment and participation in all MOOC platforms (Shah, 2020). During the pandemic, some MOOC providers cancelled their restrictions on access offering HE institutions the opportunity to introduce students to quality online learning through MOOCs (Purkayastha & Sinha, 2021). Universities worldwide reported resorting to MOOCs to sustain HE during the Coronavirus crisis. The utilisation of high-quality MOOCs appeared to be a more viable option than improvising online courses (Haber, 2020) and provided a contingency plan for online education during the pandemic (Nordmann *et al.*, 2020). MOOCs were integrated into study programmes either to complement existing courses by incorporating MOOC modules or by adopting entire MOOC courses (Haber, 2020).

A study by AlQaidoon and Shah (2020) investigated the role of MOOCs in HE during the Coronavirus pandemic using a systematic review of 21 research articles. Their findings revealed a significant increase in HE's use of MOOCs during the pandemic. They concluded that although researchers view using MOOCs in HE differently, i.e., whether they should replace existing courses, support courses or combine with other technologies, most of them agree that MOOCs play a significant role.

A study conducted by Purkayastha and Sinha (2021) of 161 HE students studying in MOOCs during the pandemic, 83% stated they wished to keep studying in MOOCs. Yet, the same study revealed that 74% of the students wished to combine MOOCs with face-to-face learning. Additionally, Houston (2020) noted that students who actually engaged in MOOC learning, adopted a positive attitude towards the experience. This supports the earlier findings of Aharony and Bar-Ilan (2016) who reported that students' sense of uncertainty was replaced by confidence as the course progressed. A study conducted by Sun (2020) revealed that most students participating in MOOCs were displeased with the lack of interaction with the teacher and their co-students, which frustrated them and negatively affected their satisfaction with the MOOC experience. She considers this a major factor contributing to the high 58% dropout rate in her study of 195 participants. Sun attributes this phenomenon to their

inability to learn autonomously. Nevertheless, she acknowledges the benefits of MOOCs over traditional learning modes and offers suggested ways to improve the use of MOOCs in HE such as introducing MOOCs into a flipped learning model, providing more interactive support, and improving the type of evaluation feedbacks students receive. Sun concludes that while MOOCs may challenge traditional HE, they could also constitute a driving force towards a breakthrough in HE (Sun, 2020).

While the COVID-19 crisis has boosted the popularity of MOOCs in colleges and universities worldwide, their adoption and use in teacher education programmes are not as widespread (Taranto, Robutti & Arzarello, 2020). The present study investigates the incorporation of MOOCs in ITE during the first sixteen months after the COVID-19 outbreak in March 2020. While it does not rely on a specific framework, it explores numerous variables identified in the literature as potentially relevant to MOOCs studies. These include students' level of satisfaction with the courses, their learning experience, perceived learning outcomes, the perception of the courses as well as the benefits. Since we conducted the study in a teacher education setting during COVID-19, we also examined whether students perceived MOOCs as a good teaching model and how important they thought integrating MOOCs in ITE was in times of crisis.

## 5. Research context

MOOCs entered the Israeli educational scene at a considerable delay after gaining popularity in numerous countries. To accelerate the opening of MOOCs and promote their usage, the Israeli government initiated and budgeted in 2016 a national project entitled "Digital Israel", which was led by the Ministry for Social Equality and the Council for Higher Education. This national project encouraged universities and teachers' colleges to create MOOCs in Hebrew, Israel's majority language. The courses were to appear on a new national platform called "Campus IL" (Lexman, John & Friedler, 2020). When the COVID-19 pandemic hit, this platform offered several dozen courses in a variety of disciplines.

The lockdowns imposed during the pandemic obligated all of Israel's HE institutions to switch to emergency distance learning. MOOCs became an overnight ad-hoc solution for the difficulty some faculty members faced teaching online. The situation was even more dramatic in teacher education colleges that opened alternative ITE programmes for unemployed second-career academics. The MoE seized the opportunity to lure quality candidates into the teaching profession, launching these new programmes to partially solve the Israeli education system's chronic and massive teacher shortage at all school levels and in most school subjects (Maariv Daily, 2020; MoE, 2020). The MoE in collaboration with several other national bodies such as the Israeli Employment Service, the Israeli Defence Force and the local authorities, initiated several alternative accelerated teacher education programmes. In 2020 and 2021, these programmes attracted several hundred candidates who were interested in becoming teachers. Opening these programmes posed a dilemma for the colleges as they were already short of teaching staff capable of undertaking so many online courses. Under these circumstances, MOOCs emerged as the most feasible solution.

## 6. Purpose and research questions

To unearth the way students perceived the inclusion of MOOCs in ITE programmes we asked the following research questions

1. To what extent do students perceive MOOCs as a good teaching model?
2. How satisfied were students with their MOOC studies, how did they perceive their learning experience, and what were the MOOC learning outcomes?
3. How useful do students perceive incorporating MOOCs in ITE programmes, and what purposes do they serve?
4. What is the preferable proportion of MOOCs in an ITE programme, and which variables best explain students' recommended proportion?

## 7. Methodology

Although we used a mixed-method design in this research, we only present the quantitative results to avoid an over-lengthy report. The institutional ethics committee of the Kibbutzim College of Education, where the researchers work, approved the research. It was conducted transparently and without conflict of interest.

### 7.1 Participants

The participants comprised 202 students who studied in alternative teacher education programmes in the largest teacher education college in Israel between March 2020 and June 2021. Since participation was voluntary, the response rate was 35% (202 out of 550). Of the total number, 67 (33%) of them studied in 2020 and 135 (67%) in 2021. They took different teaching tracks to become pre-school teachers (7%) or teachers of specific disciplines (e.g., mathematics, science, Hebrew, English) in elementary schools (50%) or secondary schools (43%). Participants' ages ranged from 21 to 60 ( $M=39$ ;  $SD=10$ ). They all held either a bachelor's degree (60%) or a Master's degree (40%).

### 7.2 MOOCs

Enrolment in the MOOCs was mandatory. Once accepted into the programme, students were informed that their studies would require taking several self-paced online courses. The assigned courses matched the students' educational background and field of studies. All the courses were offered in Hebrew by Israeli HE institutions and appeared on the "Campus IL" platform. A total of 46 courses were identified as suitable for the offered teaching and learning programmes. These included 11 courses in education and teaching (e.g., multicultural education, assessment and Evaluation, empathy in education, philosophy of education) and 35 content-based courses (e.g., geometry, introduction to chemistry, Islam, modern Hebrew poetry, literature). Students had to take 1 to 15 courses, depending on their academic status, with an average of 4.5 courses per student ( $SD=3.02$ ).

Upon completion of each MOOC, students had to submit a statement of accomplishment, a portfolio of all assignments and tasks and an in-depth reflection addressing the learning experience, benefits and challenges of that specific MOOC and whether they wished to participate in other similar courses in the future. The final grades in each course were either those appearing on the statement of accomplishment, or a grade based on the portfolio they submitted to the college. To receive the teaching diploma, they had to complete the courses successfully. All the students who took the courses completed them successfully and on time.

### 7.3 Research Instrument

The research instrument was an anonymous online self-report questionnaire especially put together for this study. Its design followed the variables identified in the literature review and it underwent the scrutiny of two educational MOOC experts that checked its content validity. All the students received the questionnaire by email, inviting them to participate on a voluntary basis. The questionnaire's introductory part briefly described the purpose of the research and assured participant anonymity. While participation was voluntary, students who agreed to participate had to fill in all the questionnaire items without exception. Most items were on a five-point Likert scale ranging from very little/low (1) to very high (5). The questionnaire included the following eight sections:

1. Personal information, educational background and MOOCs taken as part of their ITE programme.
2. MOOCs as a model for quality teaching: Students had to choose one of the studied courses and indicate the degree to which it was a good teaching model through 14 items. In an exploratory factor analysis, seven factors emerged as explaining 92% of the total variance. Each factor included two items and all the factors were reliable with Cronbach's alpha coefficients ranging from 0.83 to 0.93. The factors were: (1) has a clear syllabus and purpose; (2) applies diverse teaching methods; (3) is user-friendly and suitable as an online course; (4) presents novel content; (5) includes aids and visuals to help the learner; (6) caters to needs of a variety of learners; (7) includes varied assessment procedures. The total mean was also calculated ( $\alpha=0.93$ ).
3. Satisfaction with the course and recommending that others study in MOOC frameworks (3 items,  $\alpha=0.93$ ).
4. Learning experience: Nine adjectives representing positive and negative feelings experienced during MOOC studies. The five positive ones were rewarding, educational, enjoyable, hi-quality, and in-depth ( $\alpha=0.91$ ) and the four negative ones were lonely, stressful, difficult and burdened ( $\alpha=0.79$ ).
5. Learning outcomes: The degree to which students felt they had gained the necessary knowledge in the course and understood the material ( $\alpha=0.92$ ).
6. The perceived usefulness of including MOOCs in ITE programmes: 16 items that converged into six factors: Convenience and studying in my own time, place and pace (3 items;  $\alpha=0.95$ ); becoming an independent learner (2 items;  $\alpha=0.89$ ); studying varied topics that my institution does not offer with prominent experts (3 items;  $\alpha=0.76$ ); improves one's digital competence (2 items;  $\alpha=0.94$ ); opens new horizons for future professional development (PD) and lifelong learning (LLL) (3 items;  $\alpha=0.91$ ); will make me a better teacher and affect my teaching in the future (3 items;  $\alpha=0.95$ ).
7. The importance of MOOCs in ITE in times of crisis such as COVID-19 (6 items;  $\alpha=0.76$ ).
8. The preferable proportion of MOOCs in an ITE programme – (0%, 10%, 20%...100%).

### 7.4 Data analysis

Reliability (Cronbach's alpha) was calculated for all study variables. We used descriptive statistics (i.e., means, standard deviations and bivariate Pearson product-moment product correlations) to provide a sample description, and conducted data driven K-means cluster analysis to identify potential student profiles through their perceived usefulness of MOOCs. To explore profile differences, we ran a one-way MANOVA test, t-tests for independent

variables and chi-square statistics. Two linear regression analyses were performed to detect which variables best predict students' learning outcomes and students' preferences regarding the preferable proportion of MOOCs in an ITE programme. All the statistical analyses used SPSS 25.0.

## 8. Findings

### *Q1: MOOCs as a good teaching model*

Table 1 below presents the means and standard deviations of all seven factors that characterised a good teaching model as well as the total mean. When answering these questions, students were instructed to relate to one specific MOOC and state which one they chose. In all, the students referred to 35 different courses.

**Table1:** MOOCs as a good role model for teaching (Means and standard deviations)

	Mean	SD
Is user friendly and suitable as a self-paced course	4.35	.82
Includes aids and visuals to help the learner	4.29	.84
Has a clear syllabus and purpose	4.24	.91
Presents novel contents	4.06	1.00
Caters to needs of a variety of learners	4.04	.96
Uses varied teaching methods	3.96	1.06
Uses varied assessment procedures	3.78	1.08
MOOCs as a good teaching model (total mean)	4.10	.80

Although students each referred to a different course in answering the above questions, they concluded that MOOCs were good teaching models with a total mean of 4.10 in a five-point scale. Three aspects of the courses were ranked the highest: User-friendliness and suitability as an online self-paced course; included aids and visuals that provide scaffolding to the course and clear syllabus and purpose of the course. The lowest ranking aspects were the variety of teaching methods and assessment procedures.

### *Q2: Satisfaction with MOOC studies, students' learning experience and learning outcomes.*

**Table 2:** Means and standard deviations of satisfaction, learning experience and learning outcomes.

	Mean	SD
Satisfaction and recommendation of MOOCs	3.99	1.06
A rewarding, educational and enjoyable experience	3.75	0.89
A lonely, stressful and difficult experience	2.41	0.94
Learning outcomes	4.12	.86

As Table 2 shows, students were generally satisfied with their MOOC studies. They described their experience as significantly more rewarding and positive than lonely and stressful ( $t=12.30$ ;  $p<.001$ ) and ranked the learning outcomes as high.

Bivariate correlational analysis shows that students who described their chosen MOOC as a good teaching model were also highly satisfied with MOOC studies and recommended them to others ( $r=.62$ ;  $p<.005$ ), had a rewarding and positive learning experience ( $r=.61$ .  $p<.001$ ) and ranked their learning outcomes as high ( $r=.69$ ;  $p<.001$ ). Feelings of loneliness and stress were not strongly related to the quality of the MOOC ( $r=-.33$ ;  $p<.01$ ).

In a linear regression analysis where the learning outcomes were the dependent variable, the following four variables significantly explained 60% of the total variance ( $F=72.90$ ;  $p<.001$ ). Of the four variables, three were significant: The degree to which the MOOC was a good teaching model ( $Beta=.37$ ;  $t=6.20$ ;  $p<.001$ ), the degree to which the learning experience was rewarding and positive ( $Beta=.25$ ,  $t=3.46$ ;  $p<.01$ ), and the level of satisfaction from the MOOC studies ( $Beta=.26$ ,  $t=3.49$ ;  $p<.01$ ). Feelings of loneliness and stress did not significantly contribute to the regression equation.

### Q3: Perceived usefulness of MOOCs in ITE programmes

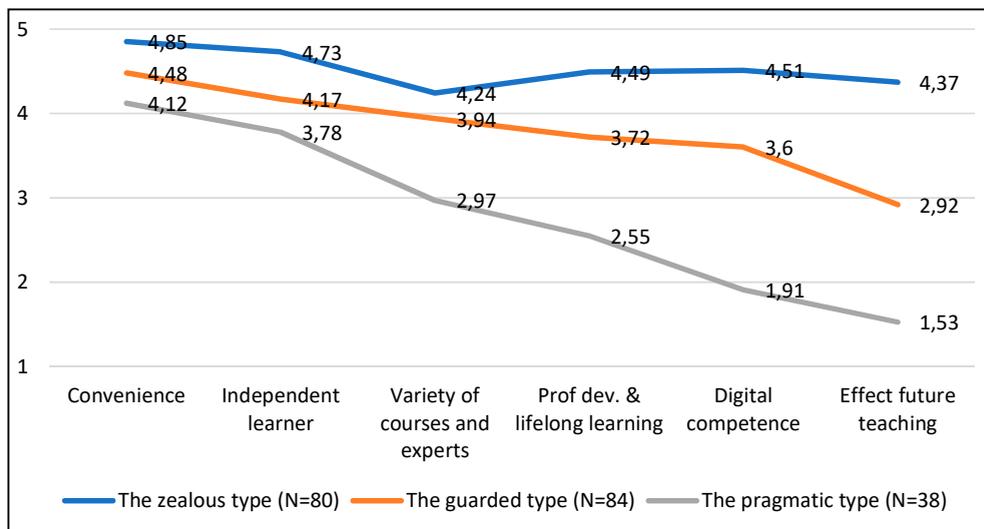
**Table 3:** Perceived usefulness of MOOCs in ITE programmes

	Mean	SD
Convenience	4.56	.68
Becoming an independent learner	4.32	.71
Study varied topics with prominent experts	3.88	.80
Open the horizons for future PD and LLL	3.81	1.02
Improve digital competence	3.64	1.16
Positive effect on future teaching	3.23	1.24

As Table 3 above shows, the factors ranked as the most useful assets of MOOCs were convenience in terms of flexible time, place, pace and becoming an independent learner. Next came the opportunity to study diverse courses that are not offered by the college with prominent experts and viewing MOOCs as an avenue for future professional development (PD) and lifelong learning (LLL). Last were MOOCs as a means for improving students' digital competence and MOOCs' effect on the future teaching of teachers-to-be.

A k-means cluster analysis of the potentially useful aspects of studying in MOOCs revealed three meaningful profiles of pre-service students. The 3-cluster solution was favoured because it resulted in a maximum number of non-redundant profiles with good representation ( $N=80$ ;  $N=84$ ;  $N=38$ ). The MANOVA showed a significant main effect ( $F=57.38$ ;  $p<.01$ ) with univariate significant effects in all six factors: convenience ( $F=18.34$ ;  $p<.001$ ), independent learner ( $F=35.61$ ;  $p<.001$ ), studying varied topics with well-known experts ( $F=47.85$ ;  $p<.001$ ), professional development and lifelong learning ( $F=88.35$ ;  $p<.001$ ), digital competence ( $F=177.03$ ;  $p<.001$ ), and impact on future teaching ( $F=256.58$ ;  $p<.001$ ). Figure 1 displays the means of the three profiles that emerged from the data. The first is the *zealous* type ( $N=80$ ) that ranks all factors as positive attributes of MOOCs. The second is the *guarded* type ( $N=84$ ) that only perceives some of the MOOCs' attributes positively, mainly convenience, becoming an independent learner and studying a variety of courses with well-known experts. The third profile is the pragmatic type ( $N=38$ ) that is highly opportunistic and benefit-driven and perceives MOOCs merely as a means to overcome barriers of time and place and does not attribute any other advantage to them. While the aspect of convenience ranked high in all three profiles, the widest gap emerged in the degree of perceived impact of MOOCs on future teaching. To rule out background variables affecting these three profiles, we examined the

differences using chi-square, t-tests for independent samples and Analysis of Variance. The analysis revealed no significant differences due to the participants' gender, age and education. The only significant background variable was the type of teaching diploma the pre-service students were studying for: the zealous type was more frequent among those studying to become primary or secondary school teachers in different school subjects; the guarded type was more frequent among those studying to become kindergarten teachers and the pragmatic type was more frequent among those studying to become English teachers for all age levels.

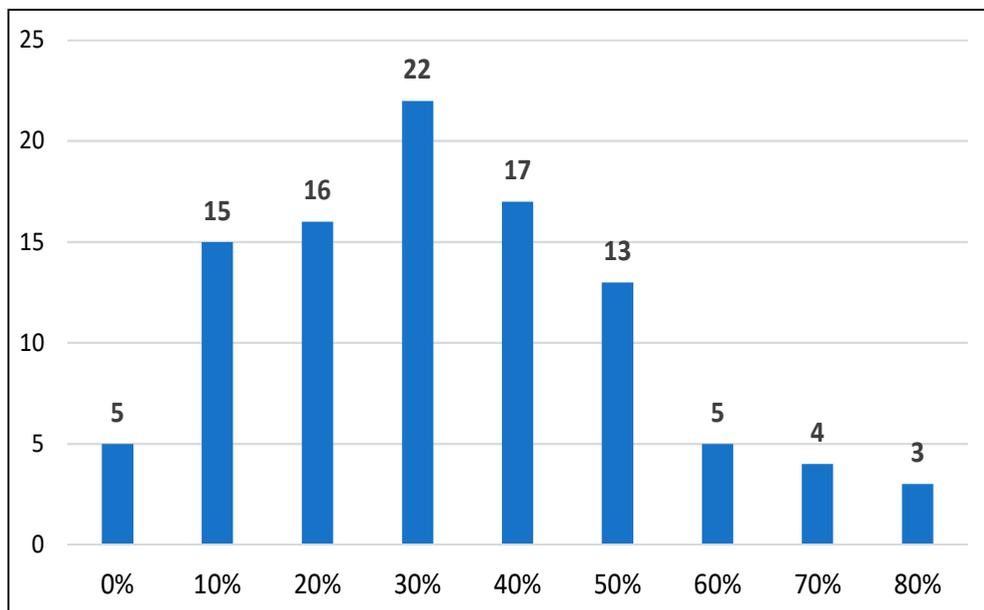


**Figure 1:** K-means cluster analysis of perceived usefulness of MOOCs in ITE

Students were also asked how they perceived the importance of MOOCs studies in times of emergency such as COVID-19. The total mean of this factor was 4.28 (SD=0.89), displaying agreement with the notion that MOOCs play an important role in times of crisis.

**Q4: Preferable proportion of MOOCs in an ITE programme**

Figure 2 below presents the distribution of students' preferences as to the proportion of MOOCs that should be included in an ITE programme. Preferences varied from 0 to 80% with a mean of 33%.



**Figure 2:** Distribution of the preferred proportion of MOOCs in ITE programmes

Positive and significant correlations were found between the preferred proportion of MOOCs in ITE programmes and all other research variables: the MOOCs as a good teaching model ( $r=.38$ ), students’ learning outcomes ( $r=.49$ ), students’ learning experiences ( $r=.51$ ), degree of satisfaction with the MOOCs ( $r=.58$ ), number of MOOCs in the programme ( $r=.32$ ), MOOCs’ importance in times of emergency ( $r=.55$ ) and all six variables of the perceived usefulness of MOOC studies (correlations ranging from  $.30$  to  $.66$ ).

Table 4 below presents the results of a stepwise linear regression analysis performed to detect what variables best predicted students’ preferred proportion of MOOCs in an ITE programme. All twelve variables listed above were inserted into the equation as independent variables. Results revealed a significant regression ( $F=17.27$ ;  $p<.001$ ) with variables explaining 52% of the total variance. Yet, only three of the twelve variables were found significant and explained 50% of the total variance all together. The contribution of the remaining variables was not significant, and they were discarded from the equation. Table 4 includes only the significant predictors.

**Table 4:** Regression analysis predicting the preferred proportion of MOOCs in ITE programme

	$\beta$	t(p)
MOOCs positively affect my future teaching	.51	7.97 (p=.000)
Number of MOOCs studied	.16	3.15 (p=.002)
The importance of MOOCs in times of emergency	.19	2.94 (p=.004)

As Table 4 above shows, students who studied more MOOCs, perceived them as having a positive impact on their future teaching and acknowledged their importance in times of crisis. Thus, they opted for including a higher proportion of MOOCs in ITE programmes.

## 9. Discussion

The findings of the present study revealed that students of the alternative ITE programmes initiated in response to the COVID-19 crisis considered the MOOCs they took as a good teaching model. The students related to both courses in education and in different disciplines, a total of 46 courses provided on the “Campus IL” platform, Israel’s national MOOC platform. The pre-service teachers described the courses as accessible and user-friendly, a weighty feature in online courses studied independently. Students also ranked highly the wealth of scaffolding provided to MOOC learners, including visuals, infographics and multimedia that support the learning process. The MOOCs received a high ranking for catering to the needs of diverse learners, having a clear syllabus and having a clearly stated purpose; these were all regarded as positive attributes of the courses that made them a good teaching model. The MOOCs were positively perceived as offering quality academic content. These findings substantiate previous studies that also attested to these positive features (Donitsa-Schmidt & Topaz, 2018; Gómez-Galán *et al.*, 2020). It is perhaps no surprise that students praise so many instructional MOOC elements. After all, their careful construction and design involved technopedagogical experts and the input of many other professionals such as content consultants, sound technicians, graphic designers and movie directors (King *et al.*, 2014). Yet, the ranking of two of the qualities of this good model was slightly lower than the others: the diversity of teaching methods and particularly that of the assessment procedures, corroborating the findings of previous researchers (Atiaja & Proenza, 2016). The limited variety of teaching methods and assessment procedures may hold true when comparing MOOCs to regular face-to-face courses. However, this is not necessarily the case when compared to online courses taught by faculty members. In many cases, the latter suffer from similar weaknesses inherent to online delivery characterised by little communication and interaction with the instructor and co-learners (e.g., Crews, Wilkinson & Neill, 2015; Jaggars & Xu, 2016). In other words, in times of emergency, the quality of MOOCs is likely to be higher than that of many in-house online courses developed instantly by faculty members.

While previous research noted that little interaction is a shortcoming that may lead to a high dropout rate (Baek & Shore, 2016), there were no dropouts in the current research. This remarkable completion rate could be explained by the mandatory nature of the courses and the fact that they are an integral part of students’ learning programmes. Such circumstances may have been an incentive for students to complete their studies since failure or even delays would have postponed their certification and entailed additional tuition fees (Chiu & Hew, 2018; North *et al.*, 2014).

Findings also showed that students ranked the courses’ learning outcomes highly and that the degree to which the MOOCs served as a good teaching model and the learning experience was perceived as positive significantly influenced these outcomes. These findings support previous arguments acknowledging the positive effect of various dimensions of good teaching in MOOCs on students’ investment in their studies and hence on their learning outcomes (Hone & El Said, 2016; Pilli & Admiraal, 2017). As in our findings, the mentioned dimensions included a well-organised, clearly displayed and easily understood course structure, challenging, interesting and up-to-date course content, good information delivery and varied learning paths.

While MOOCs ranked as a good teaching model contributing significantly to students’ learning outcomes, pre-service teachers differed in their perception of their usefulness.

The research identified three main student types: the zealous type, who is enthusiastic and fascinated by MOOCs and their advantages, the guarded type who admits to some advantages but is still apprehensive about other aspects, and finally the pragmatic type who values MOOCs for being convenient. Not surprisingly, convenience considerations ranked high with all types. As others have observed, flexibility and the ability to overcome numerous barriers such as time constraints, scheduling and travel expenses are among the most salient characteristics of MOOCs (Shapiro *et al.*, 2017). The current study confirmed the findings of previous ones which noted that the MOOC experience helped students become independent and self-regulated and decide their own path of studies (Littlejohn *et al.*, 2016). This phenomenon was particularly notable among the zealous and guarded types. While these two types saw MOOCs as an opportunity to study a range of courses with well-known experts, the students classified as pragmatic did not seem to agree. This finding is surprising since MOOCs, as OERs, are renowned for opening new horizons for the learners by offering them numerous optional interesting topics free of charge at institutions other than their own (UNESCO, 2002). The pragmatic type does not really care about learning opportunities, professional development or any lifelong education, rather focusing primarily on completing their studies as quickly as possible. Fortunately, this group was the smallest among the pre-service teachers as such an attitude was not what we would have expected from soon-to-become teachers and educators.

Finally, only the zealous type ranked the possible favourable effect of MOOCs high on students' future teaching. While this was slightly disappointing, we should bear in mind that the zealous type was most frequent among those studying to become primary or secondary school teachers. Kindergarten teachers mostly belonged with the guarded type, and the pragmatic type frequently appeared among future teachers of English as a second language. We may assume, therefore, that MOOCs have a greater weight for schoolteachers while kindergarten teachers find them less relevant. Yet, the results for future English teachers need further investigation as they seem to contradict previous research findings of the authors (Donitsa-Schmidt & Topaz, 2018).

While the pre-service teachers agreed about the value of MOOCs in times of emergency, their answers about the desired proportion of MOOCs in an ITE programme differed considerably, ranging from none to eighty per cent of the curriculum. Our findings showed that the number of MOOCs that students took as part of their programmes stood in direct relation to their preferred proportion, the perceived usefulness of MOOCs for their future teaching and the attributed value of MOOCs in times of emergency. The cumulative impact of studying several MOOCs within an ITE programme is a central finding of the current research, highlighting the effect of experiencing several courses. Previous studies have noted that exposure to MOOCs improved students' attitudes towards these courses (Aharony & Barllan, 2016; Houston, 2021). Although all MOOCs share many characteristics, each of them has numerous individual qualities that set it apart. Taking several MOOCs introduces students to varied MOOC models and helps them realise their many inherent benefits and added value to students' current learning and future professional development opportunities.

## 10. Conclusions

To conclude, this study is significant in shedding light on the positive perceptions of students taking multiple, mandatory MOOCs as part of their ITE. As such, it could offer educational policymakers alternative options to benefit their student body. Evidently, teachers cannot

acquire all the knowledge they need solely through MOOCs. Yet, judicious use of MOOCs may offer an appropriate balance between face-to-face and online learning. The right balance between the two requires further examination.

While improvements are required in several elements and characteristics of MOOCs, these courses can indisputably pave the way for a noteworthy breakthrough in the field of distance education. In terms of educational policy, it is highly recommended that every student in HE, including ITE, be exposed to several MOOCs as part of the training programme. A positive MOOC learning experience over their period of studies may encourage them to continue using this open educational resource in the future. While these courses face HE institutions and their faculty members with an enormous challenge and might appear to represent a conflict of interest (Goglio & Parigi, 2019; Tømte, 2019), we believe that the advantages of including MOOCs as a compulsory component of the training programme outnumber possible shortcomings. Yet, this requires the teaching staff to enlist in the process. They should be aware of the positive results of MOOC integration in ITE and the challenges this involves. This is how the process can become a communal effort to determine the best and most effective way to integrate MOOCs into the programme. In doing so, several issues must be addressed, such as which MOOCs to include and which courses they should replace. Such decisions would have serious consequences for the institutions and on the teaching staff.

One should not ignore broader implications regarding issues of equity in education. Many developing countries do not have the technological infrastructure required to run MOOCs smoothly. Even affluent countries have disparities in access to internet services and infrastructures (Fyle, 2013; Adam, 2020). Moreover, as learning spaces become more diversified, educational policymakers need to consider learner diversity such as digital learning abilities, self-directed learning skills and time management issues, to name but a few.

Finally, since only the zealous type ranked the possible effect of MOOCs on students' future teaching high, further research is recommended to investigate the low ranking among the two other groups. Additional research could also follow up on the participants once they have begun their teaching careers. Such research could use the typology that emerged from the findings of the zealous, guarded and pragmatic student profiles as a theoretical framework that could be elaborated on to further clarify students' perceptions.

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