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Effectiveness of teaching student teachers using e-learning during COVID-19: A glance at inclusive education from the Zambian perspective

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Abstract

The use of technology as an alternative to traditional teaching during pandemics such as COVID-19 is attracting attention globally. This study sought to explore the effectiveness of teaching student teachers using E-Learning during COVID-19. Hearing students were learning together with students with hearing impairments in an inclusive environment before the closure of an institution. A mixed approach involving concurrent design was used and 193 student teachers who were purposively sampled from Kitwe College of Education in Zambia participated in the study, of which 4 of the participants were hearing impaired. The findings were that 53.9% of the participants had access to e-learning services, whereas 48.1 % had no. The study also revealed that 86% of the participants disagreed to having benefited from e-learning and cited lack of technological devices, poor network and expenses to purchase internet bundles as some of the barriers to e-learning. The study concluded that despite 53.9% of the participants having access to e-learning, 86% of the participants did not benefit from the use e-learning, due to lack of access to internet and expenses to purchase internet bundles, and that students with hearing impairments were disadvantaged due to lack of text and sign language interpretation during e-learning lectures. The study recommended the need to provide free internet bundles to students if e-learning is to be effective, educators record lessons and enable students to access, as well as need to consider students with hearing impairments during inclusive e-learning by providing sign language interpretation and texts.

Keywords

COVID-19, e-learning, hearing impaired, inclusive education, student teachers.

INTRODUCTION

The Coronavirus which started from Wuhan, China, and resulted in a formidable outbreak worldwide in December 2019 and officially named as COVID-19, by World Health Organisation on 11th February, 2020 [1], [2] has affected not only the health, but the general livelihood of people around the world. Learning institutions have not been spared by COVID-19, thus prompting educators to employ alternative pedagogies and use technology as an alternative to traditional teaching.

The advancement of Information and Communication Technology (ICT) has necessitated the creation of computer related pedagogies, construction of knowledge and advancement of creativity in both teachers and learners which can also be used during pandemics such as COVID-19. ICT has also contributed to universal access to education,

promoting equity, delivery of quality learning and teaching, teachers' professional development, efficiency education management, governance and administration [3]. With reference to e-learning, ICT can be used to deliver effective learning experiences [4] and different approaches in e-learning, such as Massive Online Open Courses (MOOCs), Virtual Reality (VR), Modular Object-Oriented Dynamic Learning Environment (MOODLE), Google meet and gamification, with the help of Smart phones and computers which can be used by teachers and learners to support their teaching and learning processes [5]–[7].

Studies have shown that the use of e-learning promotes flexibility during teaching and learning processes, compensates for scarcities of academic staff, and is perceived to be faster and time saving [8]–[10]. Studies have also revealed that e-learning is likely to affect teaching and learning processes due to lack of ICT equipment coupled with students and/or teachers' lack of skills in computer literacy [11] as well as effects of technological errors [12].

Promoting the concept of inclusivity "leaving no one behind" in education in line with Sustainable Development Goal 4 (SDG 4) requires considering every student in a learning institution. With reference to hearing impaired students, studies show that such students can benefit from inclusive e-learning provided there is bilingual information which text and sign language [13], as well as access to technological devices and internet services.

Statement of the problem

The Corona Virus Disease 2019 (COVID-19) contributed to disruption of teaching and learning programmes around the world and Zambia was not speared. In order to safeguard the lives of students, lecturers and other staff from the effects of COVID-19, the Ministry of General Education (MoGE) closed schools and colleges of education. Nevertheless, colleges of education were to offer non- face to face lectures [14], implying that e-learning was to be used as learning platform. Determining the effectiveness of using of e-learning to student teachers thus prompted the basis of this study.

Research objectives

The following objectives guided the study: (1) to explore e-learning services accessibility by student teachers during COVID-19; (2) to determine the effectiveness e-learning to student teachers during COVID-19.

LITERATURE REVIEW

Concept of e-learning

E-learning platforms are helpful to educators and students and have been used to enhance the educational, improve collaboration and communication of educators and students [15]. E-learning is a teaching and/or learning process in which computers and communication technologies such as internet are used by educators and students to access online teaching and learning resources [3], [16]. E-learning is a modality of using knowledge predominantly facilitated and distributed by electronic means and depends on computers related devices and networks comprising systems and channels such as wireless and satellite [17]. In this context computer related devices connected to internet services can provide a learning platform.

The term 'e-learning' from distance learning perspectives, include distributed learning and online-distance learning [9], in which lectures are transmitted to distance locations via video presentations of which the advancement of technology such as internet has transformed distance learning [18], [19]. E-learning as a concept thus covers a range of applications, learning methods and processes in which multimedia information is done via text, graphics, audio and video materials [3], [20].

Inclusion of hearing impaired students during e-learning

Inclusive education is anchored on the concept of learning environments to include every learner regardless of one's learning needs and/or differences, providing necessary support learning, and respond to individual needs [21]–[23]. The four principles of inclusion sometimes referred to as the 4A's, which are; Accessibility, Availability, Acceptability and Adaptability [22], should be considered when offering inclusive learning. Sustainable Development Goals focus on the need for inclusivity in all sectors of society. SDG 4 which is particularly on education, stresses the need to develop education systems that foster quality inclusive education and promotes lifelong learning opportunities for all [24]. The concept of inclusivity "leaving no one behind" should thus be considered when learning institutions offer

inclusive education to students with special educational needs such as the hearing impaired.

Students with hearing impairments can benefit from e-learning if effectively used during inclusive education. Integrating students with hearing impairments requires educators to consider; how such students learn, their needs and special characteristics and to teach what the students are supposed to do for them to learn effectively [13]. With reference to the need for inclusion of students with hearing impairments when using an e-learning platform, the use of bilingual information which encompasses text and sign language, high level of visualisation, interactive and explorative learning, and the possibility of learning in peer groups via video conferencing [13] should be considered in that students with hearing impairments are visual learners. However, it must be noted that visualisation may not convey information accurately to the hearing impaired without text or sign language, just like hearing students would require speech sound and/or text to accompany visual images during e-learning.

The need to make students with hearing impairments to benefit from e-learning can be seen by the move taken by the World Wide Web Consortium (W3C) to create accessible html pages for students with hearing impairments, which can be used by any time-based multimedia presentation, synchronise equivalent alternatives with the presentation in that any form of multimedia [13], [21]. Multimedia such as a movies, animations or slide show as well as alternative presentations with captions which provide access to audio or visual tracks [13], [21], can be beneficial to the hearing impaired. The tangible benefits of e-learning to students with hearing impairments can only occur provided barriers to do with students' lack of knowledge basic computer skills, e-learning equipment and interruptions or system errors during lectures are removed [6], [11], [12], [25].

Benefits of e-learning platforms

E-learning has proven to be effective in education [9]. When blended with traditional teaching, e-Learning serves as assistant in the traditional classroom providing relative independence to the students [26]. Students can not entirely depend on teachers, but rather obtain valuable information via e-learning. E-learning is flexible in that students are able to choose the place and time that suits them for learning purposes. Flexibility also applies to teachers [8]. With reference to flexibility of e-learning, E-learning eliminates barriers of space and time [10] and the users in this context the teachers and students can access to a wide range of information. Gomes and Gomes [4] note that the use e-learning does not limit learning to a specific place now that time for learning is no longer confined to a certain place and period of time, but the whole space and at any time.

Collaboration is also facilitated where students are able to learn at their own pace and motivated when they interact with their peers, discuss and exchange points of view and ideas [9]. E-learning is also perceived to be faster; saving time and money in that the students don't need to travel to and institution of learning [10].

Compensation for scarcity of academic staff is another benefit that comes with the use of e-learning. Arkorful and Abaidoo [9] note that e-learning helps compensate for scarcities of academic staff, such as teachers. Few academic staff can thus attend to large population of students at the same time. Barriers that hinder participation of students in discussion are also eliminated when using e-learning in that students are able to interact freely and exchange ideas while respecting the views of their peers and subsequently improving interactivity between students as well as teachers during teaching and learning processes [9], [27]. Students who are shy and easily intimidated and who may not have the courage to speak up and express themselves in the classroom [28] can participate freely via e-learning.

Consideration of individual needs of learners is an aspect that can be facilitated via e-learning in that the use of e-learning takes into consideration the individual learners differences. Some learners may prefer to concentrate on certain parts of the course, whereas others may prefer to review the entire course [9] thus students are likely to learn at their own pace. Other benefits of e-learning include accomplishing objectives within the shortest period [29] and students being able to repeated listen or watch recorded information and interactive activities students and educators [30], which provide opportunities for student to revise and consolidate their grasping of concepts.

Disadvantages of using e-learning platforms

E-learning has its demerits to both students and educators. Shettar et al. [2] note that integrating

ICT into the teaching and learning processes is a complex process and difficulties such as Teachers' insufficient ICT knowledge and skills and challenges of integrating the use of ICT in instruction are likely to be encountered. Scarcity of technological devices and equipment is likely to impede the use of e-learning in that many schools lack necessary e-learning equipment, such as highly efficient devices and Internet connections [11]. Lack of e-learning equipment coupled with students' lack of skills in computer literacy and self-motivation [11], [25] can affect learning via e-learning. Computer literacy is cardinal for e-learning and students without appropriate skills and knowledge in computers can be affected during e-learning.

E-learning is dependent on technology such as internet and computers which may cause interruptions during lectures and/or students failing to have access to appropriate technological devices. Interruptions or system errors may appear during lectures [12] which may subsequently de-motivate students and teachers. With regards to socialisation, Sakshi and Dhull [12] note that lack of physical interaction and presence of colleagues may lead to students feeling isolated.

Development of interpersonal skills in students may be negatively affected in that effective improvement of communication skills of students require physical interaction of individuals to some extent and the use of e-learning method may not provide such opportunities. Arkorful and Abaidoo [9] note that despite students likely to excel academically, the use of e-learning limits the acquisition of much needed skills in learners to deliver their acquired knowledge to others. The inability to share one's knowledge with others thus is a negative effect likely to be created by e-learning methods. Similarly, e-learning may also deteriorate institutions' role of socialisation, which is paramount to the teaching and learning processes as well as the role of instructors as the directors of the process of education [9]. The over dependence on computers and networks, as aspect characteristic of e-learning in this context [17] can affect the role instructors play to some extent in that some students may have access to information, instructions and guidance with little or without assistance from teachers.

E-learning may apply in other fields of learning and may not yield appropriate results when used in fields that require hands-on. Pure scientific fields that require practical activities cannot be properly studies through e-learning [9]. However, the use of e-learning can be more appropriate in social science and humanities than the fields such as medical science and pharmacy, where there is the need for students to develop practical skills.

RESEARCH METHOD

The study implored a mixed approach involving Concurrent design. Concurrent designs allow the collection of both qualitative and quantitative data at the same time [31], [32]. About 630 students were targeted in this study, but only 193 participated. The targeted population comprised full time students and students under distance learning at Kitwe College of Education in Zambia. The 193 participants who took part in the study included twelve (12) Early Childhood Education Students, twenty-one (21) Primary Teachers Diploma Students, Seventy-seven (77) Secondary Diploma students and eight-three (83) were Primary Degree students. Four (4) student teachers out of the 193 participants were hearing impaired in that the College provides Inclusive Education. Participants were purposively sampled. Survey software created using Google forms containing open and closed ended questions were sent to students. A Survey software instrument protocol is usually questions typed using Google forms. The link for survey can be sent to participants e-mail or WhatsApp and shown on a computer screen or Smartphone when a responded opens the link. In this study, the survey link was sent to students WhatsApp groups. Google forms are alternatives to Survey Monkey as survey software. Survey software is an application that can be used to collect data from a targeted sample using computer assisted devices. Surveys thus can be used to generate both quantitative and qualitative data at the same time [31]. Quantitative data in this context was generated based responses from likert-scale, whereas qualitative data generated from explanations and narrative responses. During the time of data collection, students were in different provinces of Zambia following the closure of colleges due to COVID-19. Google meet was used as an e-learning platform. Google links were created and sent to students WhatsApp groups to invite them to join and participate in lessons.

Prior to the collection of data, permission was sought from the students; assured of confidentiality and the nature of the study explained to participants. Data was analysed both quantitatively and qualitatively. Quantitative was analysed using excel and Google sheet generated tables whereas qualitative data was analysed thematically based on emerging themes from the responses of participants.

RESULT AND DISCUSSION

Figure 1 shows that out of the total number of 193 participants, 12 were pursuing a teacher's Diploma programme in Early Child Education, 21 were Primary Diploma Students, 77 Secondary Diploma students and 83 were Primary Degree students. The number of participants was significantly low compared to the 630 students who were initially targeted to participate in the study.

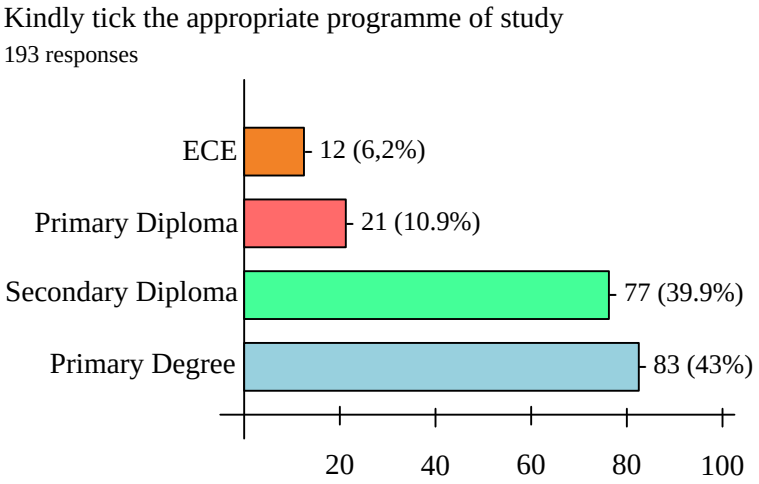

Figure 1. Shows the participants' programme of study

The first objective of this study was to explore the accessibility of e-learning services by student teachers during COVID-19. The first question which was on accessibility of e-learning was linked to the first objective.

The results show that 42.6 % of the participants agreed to having access to e-learning, 10.2% strongly agreed, implying that 52.8% confirmed having access to e-learning services, whereas 47.2 had no access to e-learning.

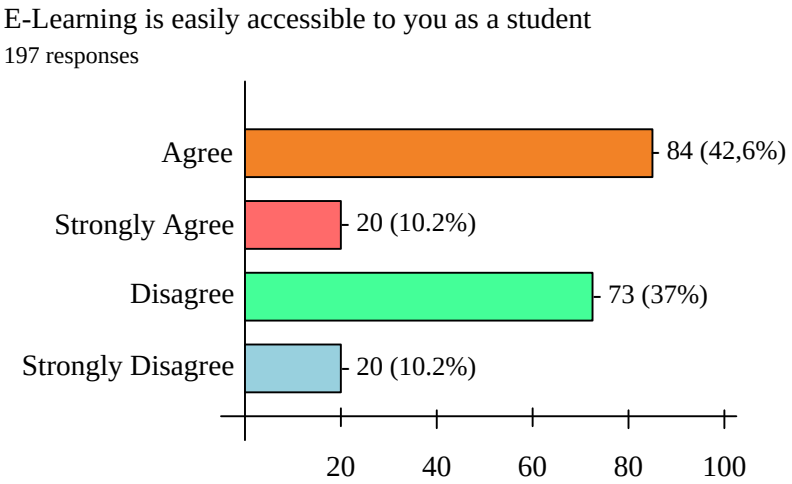

Figure 2. Shows the accessibility of e-learning by student teachers

Some of the responses from the participants who acknowledged having access to e-learning were that; students were able to access e-learning at anytime and anywhere provided

there was network, others acknowledged accessibility to e-learning but with difficulties, whereas others indicated that they were able to benefit from e-learning during COVID-19.

The following is the response from the participants;

"I am able to have access to learning at anytime and anywhere as long as there is internet connection. It doesn't require one to move the physical body to go and get documents from school; one can get them as quickly as possible".

It can be noted from the response provided by one of the participants above that the use of e-learning enabled some student teachers to have access to lectures anywhere provided there was access to internet connectivity and that they were able to have access to documents prepared by lecturers. Based on the responses above, it can be noted that e-learning provided flexibility to some students as they were able to choose the place that suits them for learning purposes. The aspect of flexibility when using e-learning concur with other authors [8], [10].

The other response was that:

"E-learning is accessible at times but due to network problems being experienced and challenges with finances to buy internet bundles; e-learning makes learning to be unstable".

The other participant's response was that:

"I can access e-learning and I am benefiting more as a student, especially during period of COVID-19 when we are not able to have face to face learning".

Based on the responses provided by participants, access to e-learning was not consistent in that students were unable to access lectures in some cases due network problems coupled with challenges to purchase internet bundles, thus making e-learning unstable. Nevertheless, the benefit of accessing lectures via e-learning in the absence of face-to-face learning due to COVID-19 was cited by one of the respondents. The findings on network inconsistence is similar to findings on technological interruptions or system errors may appear during lectures [12] which can disrupt learning. Despite other participants citing inconsistence of network during e-learning, the advantage of e-learning replacing during face-to-face learning and some students continuing with their education during COVID-19 was applauded by some students.

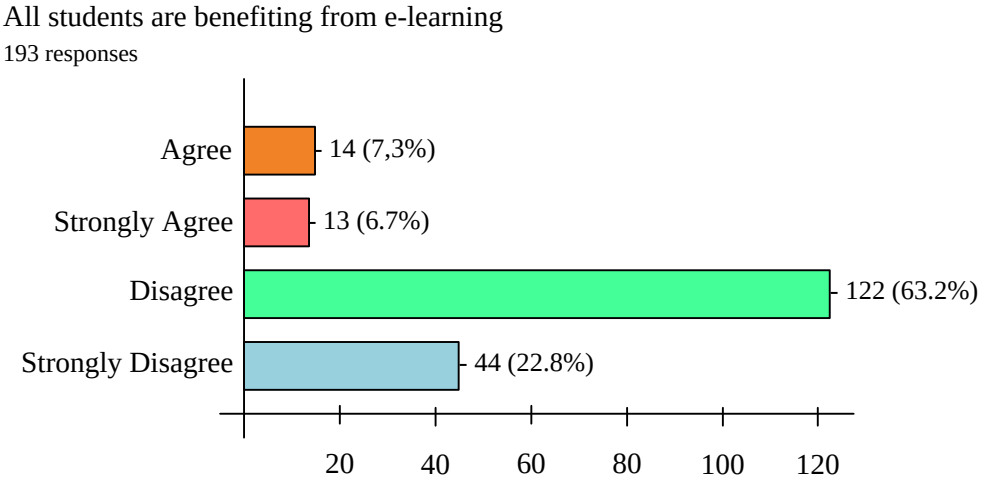

Figure 3. Shows responses from students on students benefiting from of e-learning

Figure 3 shows that 63.2% disagreed and 22.8% strongly disagreed to students benefiting from e-learning, implying that 86% of the participants disagreed to students benefiting from e-learning during COVID-19. Only 14% of the participants agreed to having benefited from e-learning.

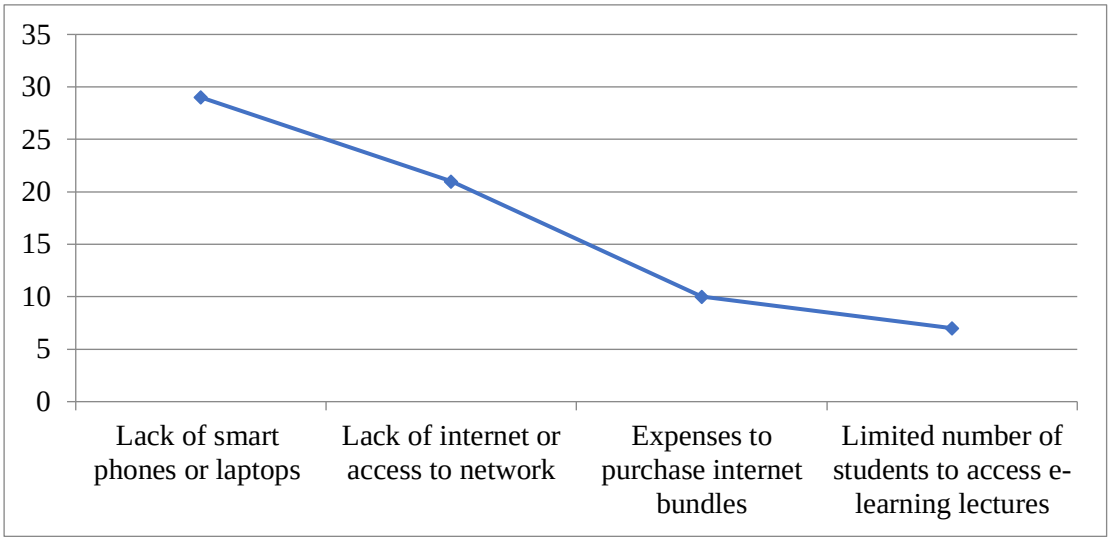

Figure 4. Shows responses from students on reasons for not benefiting from of e-learning

Commenting on the reasons for not benefiting from e-learning, 43% of the participants cited Lack of smart phones or laptops, 31% Lack of internet or access to network, 15% challenges to buy internet bundles due to expenses involved, 11% cited limited number of students to log in during lectures.

Some of the themes that emerged from the responses of participants for not benefiting from e-learning were; lack of Smart phones or laptops, lack of internet or access to network, expenses to purchase internet bundles and limited number of students to access e-learning lectures.

Responding to students benefiting from e-learning, one of the participants' responses was that:

"Not everyone has a smart phone or laptop and some places have no network. Most of the time students complain over lack of network and sometimes we experience loss of connectivity during lectures making it difficult for them to benefit from e-learning".

Based on the response above, lack of smart phones or laptops as well as network challenges inhibited the participation of students to e-learning in that e-learning require the use of smart phones and good network system, without which learning cannot occur.

Because some people stay in remote areas and some of them don't have phones that can access the internet. In some cases some students may lose the connectivity of the internet which becomes a challenge to them and lack of smart phones. The findings concur with Randy [11]; Panyajamorn et al. [25]; and Sadeghi [12] on lack of e-learning devices and internet connectivity affecting e-learning. E-learning is dependent on internet services and devices such as smart phones and computers, without which, e-learning is practically impossible. Lack of smart phones, computers and access to internet thus created learning barriers for student teachers via e-learning during COVID-19.

One of the themes from participants was on purchasing of bundles as can be noted from the following response:

"Not all students benefited from e-learning due to insufficient funds to buy internet bundles. It is very expensive to buy internet bundles to use for e-learning every day and others have no phone to use".

The use of e-learning created extra costs to students in that internet services were not free. Lack of funds to purchase internet bundles in this context created a learning barrier for student because they could not access education provided via e-learning.

Some participants cited the limited number of students to attend e-learning lessons and lack of sign language interpreters as reasons for students not benefiting from e-learning as expressed in the response below:

"The number of students to attend e-learning lessons was limited and sometimes lecturers were not allowing students to join during lectures when a student wanted to… Deaf

students didn't have sign language interpreters, making it difficult to follow lectures online".

The use of Google meet as an e-learning platform provided limitation to the number of students attending e-learning lessons as can be noted from the response above. Lack of sign language interpreters for students with hearing impairments disadvantaged such students who depend on interpretation of concepts through sign language interpreters to participate in learning. It must be noted here that when lectures are offered via e-learning, for inclusive learning to occur, students must be attended to collectively and individually, thus the need to ensure that information provided to students through e-learning contains not only visualisation, but also text and sign language [13], if hearing impaired students are to benefit from inclusive e-learning.

CONCLUSION

Based on the findings, the study can conclude that despite 52.8% of the student teachers confirming having access to e-learning services, 86% of the participants did not benefit from the use of e-learning during COVID-19, due to lack of Smart phones or laptops, lack of internet or access to network and expenses to purchase internet bundles. The four students with hearing impairments who had access to e-learning were also disadvantaged due to lack of text and sign language interpretation during e-learning lectures.

Based on this study, the following are appropriate recommendations. First, here is need to provide free internet bundles to students especially during pandemics such as COVID-19 if e-learning is to be effective. Second, educators must use e-learning platforms with provisions to record lessons and enable students to access the lessons at their time of convenience. Third, there is need to consider students with hearing impairments during inclusive e-learning by providing sign language interpretation and texts. Despite the findings revealing more challenges incurred by participants during the use of e-learning, it must be noted that the aspect of flexibility and e-learning replacing face to face learning during COVID-19 as applauded by some students should not be overshadowed by challenges that came with e-learning. The interventions to eliminate the challenges are what matter most because education has to continue even during the time of pandemic without leaving anyone behind.

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