

## **Information and Communication Technologies (ICTs) For E-Learning in Tertiary Education in Sri Lanka: A Study of Undergraduates from State Universities in Colombo District**

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### **ABSTRACT**

E-learning was introduced to tertiary education during the Covid 19 Pandemic. Therefore, the study aimed to investigate the opportunities and challenges faced by undergraduates in state universities in Colombo District in relation to e-learning. Technology Acceptance Model (TAM) was used as the main theoretical framework and the qualitative approach was applied through interviews and Focus Group Discussions (FGDs). Data were collected from all state universities in Colombo district using purposive sampling. The results showed that the majority of undergraduates have a positive attitude towards e-learning. Because e-learning is timesaving, convenient and cost-saving during the pandemic and socio-economic issues in the country such as fuel issues, power cuts etc. On the other hand, the undergraduates faced some challenges in e-learning such as a lack of ICT tools and equipment, connectivity issues, the cost of data, background noises, a lack of interaction with peers and teachers, health issues such as eye issues, anxiety etc. The results showed that the challenges of e-learning mainly occur due to the issues connected to ICTs. Therefore, the responsible authorities should take proper measures to provide adequate ICT infrastructure and resources for students to have a convenient and flexible e-learning system. In this context, it is also important that the state universities make the arrangements to have flexible learning for undergraduates. Therefore, hybrid learning allows undergraduates to attend traditional face to face sessions while also attending online classes, reducing transport issues, expenses, optimizing ICT infrastructure and resource utilization.

**Keywords:** E-learning; Tertiary education; State universities; Sri Lanka, Information and Communication Technologies (ICTs)

## **INTRODUCTION**

Education has shifted from face-to-face classroom systems to e-learning, which is the most popular learning system from primary school to tertiary education institutes during the covid 19 pandemic. E-learning was not earlier popular though some tertiary institutes were trying to promote it. The use of applications in communication to pass knowledge has increased significantly. In 2020, COVID pandemic caused mobility restrictions, forcing people to switch to online education. Government authorities shifted their attention to e-learning facilities to minimize the damage to the education system, allowing universities and other education institutes to start online education (Wu et al., 2010).

Therefore, many countries all over the world have taken necessary measures to introduce e-learning. Priyashantha, Pratheesh, & Pretheeba, (2022) state that due to closure of schools to prevent the spread of COVID-19 showed how quickly the government education sector responded to the situation. As a result, there was a shift from face-to-face teaching to online and other distance education methods.

As far as the Sri Lankan context is concerned, the responsible authorities have introduced e-learning from primary education to higher education during Covid 19 pandemic. Liyanagunawardena et al. (2014) note that Sri Lanka is noted in the South Asian region for its excellent performance on literacy rates. According to the details in Sri Lanka, opportunities for university entrance are not sufficiently comparable to the number of students who meet basic requirements from Advanced Level, this is due to lack of ICT infrastructure and available facilities. If e-learning can be introduced, government expenses, utilization of infrastructure, and other resources can be optimized. More students can get more opportunities for higher education by fulfilling the national requirement. Following the COVID-19 outbreak in the country, the University Grants Commission (UGC) has taken several steps to give students "nonstop education" via online learning systems by making a policy decision to continue education. Since long before the COVID-19 epidemic, many universities in Sri Lanka have been using moodle, a free and open-source learning management system.

Therefore, the opportunities and challenges of e-learning in tertiary education can be identified. Subashini et al. (2022) note that as online education was highly useful during the COVID pandemic period, it was replaced with a traditional system as soon as the COVID threats were over and mobility restrictions were removed. Again, mobility difficulties were there due to the fuel crisis, and government educational institutes decided to continue their studies via the Internet for a few days every week. This behaviour reveals the challenges and opportunities of e-learning in tertiary education.

As far as the challenges of e-learning are concerned, the challenges mainly occur in e-learning due to the unfair dissemination of Information and Communication Technologies (ICTs) throughout the country. Madhubhashini (2021) states that e-learning is mainly based on the improvement of Information and Communication technologies (ICTs). Therefore, according to the Annual Report of the Asian Development Bank (ADB) in 2020, evaluations of student involvement and performance become substantially more challenging in the absence of a protected broadband connection especially in remote areas. Poor network access during online learning was one challenge that the students had to deal with. Students are looking for

reasonably excellent coverage in specific regions because there are not any affordable or fair mobile internet packages available. Power failures may also result in connectivity problems. Without the requirement for a stable internet connection, student engagement and success ratings become much more difficult, especially when they want to mix interactive instructions, yet most students are not interested in fully embracing e-learning technology. Online classes restricted students who did not have the economic strength to buy the required ICT equipment, and they were not able to communicate with their peers and instructors. The students who have new ICT infrastructure facilities, equipment, tools etc. are capable of having benefits of e-learning.

Apart from the opportunities and challenges connected to ICTs, various personal and institutional factors also affect e-learning. Madhubhashini (2022) notes that the students face several challenges and opportunities in e-learning during the pandemic. Therefore, the challenges and opportunities of e-learning occur due to personal factors such as ICT skills, motivation, biological reasons, and institutional factors such as working culture, practices, traditions, supportive mechanisms, and resources. Moreover, the undergraduates of Social Sciences of the Open University of Sri Lanka face a lot of issues in e-learning such as ICT skills and literacy, ICT infrastructure, technical and financial issues etc.

Therefore, according to the literature, there is no research conducted to find out the opportunities and challenges of e-learning faced by undergraduates attached to all the Art faculties of the state universities in Colombo district. In order to fill the gap, this study was done. In this context, the main issue investigated in this study was what are the opportunities and challenges of e-learning faced by the undergraduates in all the arts faculties of the state universities in Colombo district. Therefore, the main purpose of the study is to investigate the opportunities and challenges faced by undergraduates in e-learning using the Technology Acceptance Model (TAM).

## **LITERATURE REVIEW**

### **E-LEARNING DURING COVID-19 PANDEMIC**

Scholars and researchers have defined e-learning in different ways. E-learning is frequently described as being different from face-to-face learning. The actual classroom is replaced using web-based tools, which allow for opportunities for outside-of-class learning independent of time, place, and pace (Anne-Mette et al., 2018). In the context of tertiary education, the term "e-learning" is frequently taken to refer to courses that are offered entirely online. Blended learning is a combination of face-to-face (F2F) and online learning. It allows the learners to study at their own pace. Sometimes it seems that the terms blended learning and hybrid learning are used synonymously (Ryan et al., 2016). This shows that e-learning is seen as the opposite of classroom instruction, traditional teaching, or face-to-face teaching. Several terms are used to cover e-learning, such as online learning, virtual learning, network learning, and web-based learning.

In 2020, the COVID-19 pandemic spread all over the world in a rapid way, and most areas were locked down. Therefore, there was a serious negative impact of education, as a result e- learning was introduced to education. Riyath et al. (2022) note that in most countries worldwide, the COVID-19 pandemic has seriously affected most sectors. One of the sectors worst affected by this pandemic is education. As a result, most students have been forced to stay out of their educational institutions. As of April 2020, 90% of the world's student population has been affected.

The definitions of e- learning and given practical realities show that e- learning has several opportunities and challenges. Pokhrel and Chhetri (2021) note that many countries responded to the pandemic by implementing lockdown and social distancing measures, resulting in the closure of schools, and training institutes. Distance education through e- learning has become a solution for this global pandemic, even with the challenges posed to both educators and students. During the pandemic, academic institutions in all countries must be ready to transfer on-campus courses to the virtual campus, which helps to maintain social distance and reduce the source of COVID-19 spread. So, the opportunities of e- learning include the accessibility of online education on a worldwide scale and the ability to save time, money, and effort.

Apart from the opportunities of e- learning, there are some challenges in e-learning. Without proper ICT infrastructure facilities, e-learning cannot be properly done. Galagedarage (2015) notes that e- learning is challenging in developing countries compared to developed countries due to unfair dissemination of ICTs in developing countries. Therefore, there is a divide between information rich and information poor between developed and developing countries. Due to this digital divide both the students and the teachers face problems in e-learning such as ICT literacy and skills, motivation, ICT resources and infrastructure etc.

#### **E- LEARNING DURING COVID 19 PANDEMIC AT THE LOCAL LEVEL**

E- learning was introduced to the education system including to tertiary education during the covid 19 pandemic. According to the Sri Lankan university grant commission, there were 98,919 undergraduates and 34,739 postgraduate students enrolled in 17 state universities in 2022.

Haththotuwa and Rupasinghe (2021) state that due to the pandemic situation, face-to-face lectures were not able to take place in Sri Lanka. Moodle-based learning management systems were hosted on university web servers to offset the impact of interrupting learning. The Lanka Education and Research Network (LEARN) was linked to university web servers and was used for online learning. Throughout the epidemic, all internet service providers in Sri Lanka gave free access to university web servers until August 17, 2020. Therefore, almost all universities and state Higher Education Institutions (HEIs) in Sri Lanka prefer Zoom over other popular virtual conference platforms such as Cisco Webex, Google Meet and Microsoft Teams for conducting online classes. Therefore, Zoom has become a popular teaching platform for delivering online classes in Sri Lankan universities and state HEIs. The Zoom platform was primarily used for teaching, and WhatsApp and/ or emails etc. were used as a communication medium between teachers and students.

After the COVID pandemic, again the education system in Sri Lanka was interrupted due to fuel issues, transport issues and power cuts. Therefore, e-learning has become the only

option to keep education alive. Madhubhashini (2022) notes that by considering these continuous interruptions e-learning as the only solution, question aroused whether e-learning can override the traditional education system if lectures and students are well equipped with ICT facilities and tools such as smartphones, laptops, quality network services with proper coverage, etc. If this is possible, this would be a good solution to maximize the utilization of infrastructure such as the number of universities, classrooms, etc. and provide tertiary education opportunities for more students. It is worth researching the success rate of e-learning and the possibility for carrying it out continuously despite difficulties on physical presence in institutes.

Several research found that there are challenges and opportunities of e-learning due to ICTs. Madhubhashini (2021) notes that the students face several challenges connected to the ICTs in e-learning. Both students and teachers must have access to the right ICTs at the right time to have effective e-learning. Moreover, both students and teachers also require reliable internet connectivity for e-learning. Effective e-learning is mostly dependent on a strong ICT infrastructure, which Sri Lanka still considers to be a challenging objective. Despite Sri Lanka having a 50% internet penetration rate, students who live in many rural locations have had difficulty connecting to the internet.

Likewise, the literature shows that the students face several challenges connected to the ICTs in e-learning. Different scholars have defined ICT in different ways. The United Nations Development Programme (UNDP) defines ICTs as information handling tools which are used to produce, store, process, and exchange data, facts and information. These information handling tools are old media including radio, television and telephones, and new media including computers, satellite, the Internet and more. ICT involves the collection, processing, storage, and exchange of information, data, and facts in the form of text, visuals, sound and graphics for socioeconomic, cultural, scientific, educational and political considerations among individuals, groups, organizations and countries (Xiaoming & Jinqiu 2008).

Subashini et al. (2022) also note that successful implementation of e-learning systems was influenced by a variety of factors such as technology readiness, attitudes, and perceptions of both teachers and students. Having access to online resources, proper hardware (such as computers and cell phones), and a certain level of computer literacy could be recognized as the technology readiness attributes. The success of such systems, however, is greatly influenced by how students and teachers view e-learning, particularly in terms of technology acceptance and personal learning styles. Additionally, the capacity of instructors to advance themselves to online teaching and learning systems is important. The importance of e-learning in times of crisis was recognized.

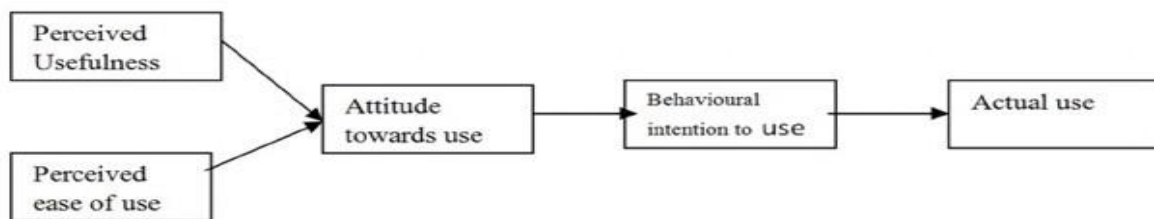
Lakmal et al. (2021) also examine the challenges and new opportunities in e-learning in Sri Lanka during the COVID-19 epidemic by taking undergraduates and faculty members of the University of Kelaniya as samples. The research has identified three major challenges that weaken online learning adaptation in Sri Lanka: inadequate e-learning facilities, resistance to change, and inadequate skills in e-learning pedagogy; and four significant opportunities: flexible learning, global and local exposure, a good time for blended learning modes, and a platform for creative problem solving in online education at the University of Kelaniya.

Though there were several studies conducted in finding opportunities and challenges faced by the undergraduates in e-learning, these studies were only done considering only one

university. Therefore, the Technology Acceptance Model (TAM) is the main theoretical framework since this study investigates the challenges and opportunities of e-learning faced by undergraduates in state universities in Colombo District.

The TAM explains how as Perceived Usefulness (PU) and Perceived Ease of Use (PEOU), assistance to adopt the innovation process and changing user's Attitude (A), Behavioral Intentions (BI) and Actual Computer Usage Behavior. The TAM also suggests that perceptions of usefulness and ease of use are mediated by some external variables including individual differences, system characteristics, social influences, and facilitating conditions (Malhotra and Gallwta, 2009). In this context, e-learning was introduced to the undergraduates as an innovation during covid 19. Therefore, the undergraduates have adapted to e-learning, understanding the benefits and ease of use of this alternative learning solution during Covid-19 pandemic. Then the behavioral and attitudinal changes occurred to have e-learning as explained in the TAM theory. After adopting to this innovation by undergraduate students, it was found that there were challenges and opportunities in e-learning based on the socio-economic and educational characteristics of different individuals, system characteristics, facilitating conditions such as institutional support and ICT infrastructure etc. Therefore, the TMA is the most appropriate model for this study to investigate the opportunities and challenges of e-learning.

Figure 1



Technological Acceptance Model (TAM)  
Source: (Davis et al.1985)

## METHOD

The study aimed to investigate the opportunities and challenges faced by undergraduates in state universities in Colombo District in relation to e-learning. Therefore, the samples were selected from the state universities located in Colombo district. Because the ICT facilities are mainly limited to the capital Colombo (Department of Census and Statistics, Sri Lanka 2012). Therefore, the data were collected from the undergraduates attached to the arts faculties of state universities in Colombo district in Sri Lanka. Because seven universities out of seventeen state universities are mainly located in Colombo district: University of Colombo, University of Moratuwa, The Open University, University of Sri Jayewardenepura, University of Kelaniya, University of the Visual and Performing Arts and Gampaha Wickramarachchi University of Indigenous Medicine. But there is no arts faculty or Humanities and Social Sciences related

programmes at the Gampaha Wickramarachchi University of Indigenous Medicine university and the University of Moratuwa.

Madhubhashini (2021) notes that the undergraduates from the arts faculties of the state universities face challenges in e-learning such as IT skills and literacy, IT infrastructure, technical and financial issues compared to the other faculties such as Engineering, Technologies, Sciences etc. According to the Sri Lankan University Statistics in 2020 provided by the University Grants Commission more than 60 % of undergraduates are from the Humanities and Social Sciences and related fields compared to the other disciplines.

The study used the qualitative approach, applying the FGDs and semi-structured interviews. The purposive sampling method was used to collect data. FGD is a structured discussion used to obtain in-depth information (qualitative data-insight) from a group of people about a particular topic. It is important to have 8-12 respondents in a discussion (Omar, 2018). Therefore, fifty undergraduate students were taken for the FGDs. Moreover, ten undergraduates from each university were taken for each FGD.

Gill et al. (2008) note that interviews provide a deeper understanding of a social phenomenon. In other words, detailed insights of a particular subject or an area can be collected from individual participants using the interview method. Therefore, the personal interviews were conducted with five lecturers representing all the selected state universities. The qualitative data were analysed thematically.

Some limitations were caused in the study due to some geographical and subjective reasons. The undergraduates were only selected from the arts faculties of the state universities located in Colombo district due to time and financial constraints in travelling to other areas. But the population and sample size can be expanded to find more practical findings/results in a future study in a systematic and methodical manner.

## **RESULTS AND DISCUSSION**

The TAM theory was used as the main theoretical framework to investigate the opportunities and challenges faced by undergraduates in state universities in Colombo District in relation to e-learning. Therefore, before identifying the challenges and opportunities of e-learning, the demographic details of the respondents can be presented. Out of 50 participants, most undergraduate students were less than 25 years old (79%) and others between 25-30 (21%). It is important to note that most of the respondents were female, 65% and 35% males and 50% had monthly income by engaging in part time jobs and the rest did not have any income and depending on the parents. According to the results, the highest employed students reported from the Open University of Sri Lanka (OUSL) since the OUSL mainly caters to the working adults. The results also showed that the majority of the respondents, 67%, were taking their study programme in Sinhala medium and 33% in English medium. According to the Sri Lankan

University Statistics in 2020 provided by the University Grants Commission, the majority of the undergraduates in Humanities and Social Sciences study in Sinhala medium compared to the other disciplines.

The results showed that the majority of the undergraduates attached to all the state universities emphasized that e- learning is the best alternative way of learning during the covid 19 pandemic. The TAM theory also shows the importance of ease of use and usefulness of technological innovations or practices. A student from the University of Colombo stated that “E- learning is time saving, user friendly and convenient during this pandemic. I am engaged in a part time job. So, I can easily refer to the recorded zoom lectures and complete the assignments on LMS”. According to the findings of the study, ICTs can be successfully used for e- learning. The UNESCO report on COVID-19 and higher education: Today and tomorrow (2020) also highlights that e-learning is always facilitated by ICTs. Moreover, there are basic and essential characteristics of e-learning: interactivity, flexibility, user friendliness etc.

Therefore, the results also showed that the undergraduates had a flexible learning environment in e- learning. Moreover, the undergraduates could easily refer to the recorded lectures and supplementary materials even though they missed any of these online lectures due to connectivity issues, electricity failures, lack of ICT tools and infrastructure facilities, employability etc. It was also found that the learn zoom platform was mainly used to conduct online lectures and assessments were mainly conducted through the LMS.

In addition to that, the undergraduates improved their language and ICT skills after introducing e- learning. The respondents empathized that the language is not a barrier to use the LMS or other online platforms. The results also showed that the young undergraduates were able to manage the zoom platform, LMS and other online platforms. In other words, the majority of undergraduates attached to the conventional universities were good in ICT skills while some undergraduates of the Open University of Sri Lanka faced some technical issues due to the lack of ICT skills. Because the Open University of Sri Lanka (OUSL) is the only state university which provides the Open and Distance Learning (ODL) for working adults. Therefore, the adults were not technologically sound compared to the young undergraduates in the other universities. Rameez (2020) also notes that it is important to improve the ICT infrastructure facilities and skills to continue the online education offered by the state universities.

It was found that the majority of undergraduates have a positive attitude towards e- learning. Moreover, it was identified that all undergraduates have accepted the technology and are willing to accept e-learning. On the other hand, the undergraduates faced several challenges in e- learning. Since the University of the Visual and Performing Arts offers practical-based subjects, the students found difficulty in e- learning. Karunaratne et al. (2020) also highlight that both students and teachers have positive attitudes towards the e- learning even though there are some issues connected to the e- learning due to the individual factors, technical issues, infrastructure issues etc.



Most of the respondents agreed one of the major concerns that should be addressed is the technical part of e-learning, such as internet connection, download and upload problems, Zoom connection etc. In addition to that, the undergraduates faced several challenges due to financial issues. Therefore, the undergraduates were unable to afford ICT tools like laptops, smart mobile phones, ICT equipment, data packages, etc.

The study found that the students experience the problem of not having a good network, which is one of the main issues. Easy access to computers and the internet stimulates students' interest in accessing their online courses quite often. The other is the high-cost need being spent on data. From the study, it was clear that the undergraduates had a lack of devices; most of the undergraduates used mobile phones to access internet, which would have been easier if they had been able to use a laptop. A student attached to the university of Jayewardenepura stated that "I live in a remote area. So, due to the signal issues and connectivity issues, it is difficult to do online learning. My sister and I share the same mobile phone. So sometimes, one of us misses our online lectures. Buying a laptop is also difficult for us due to financial issues. We have an old desktop at home, but unfortunately the microphone is also not working. Spending money to buy data packages and cards is not that easy for us".

In fact, the collected data pointed out that the preferred device for online learning was a personal computer or a laptop, but resources that needed to be shared or unable to afford in certain households were problematic. Students expressed the trouble concentrating at home. A student attached to the Open University stated that "I can't focus because it's noisy. There are too many people at home, and they keep talking when I'm having class." And a student from Kelaniya University mentioned that "I hear street noise. I just can't focus on the lecture".

The results showed that the physical discomfort resulted from having online learning for too long. As noted, students have to spend at least 5-6 hours a day on e-learning using the device. Some students said they had experienced eye problems. Limited peer groups and lecture interaction were identified according to the findings of the study. This could be not being able to see them physically made them feel isolated as it is difficult to understand the other when they message as the face reaction is not felt.

Several respondents indicated that it was difficult to get help from peers when it is online, and it takes away the opportunity to interact with others. A student attached to the University of Colombo stated that "I do miss being able to talk out difficulties in the course that I am having. I personally learn better if I'm able to meet my peers physically to share information with other people." Another student from the same University stated that "Group projects seem to be more difficult since we do not see each other in class.".

According to the results it was revealed that the problem of constant power cuts had affected the work of learners, making them helpless. According to the study most of the undergraduates conveyed that frequent electricity shortage has made online learning a problem because of its disruption. Electricity, like the internet and electronic devices is a major infrastructure and contributor to online.

On the other hand, the university teachers emphasized that some innovative teaching techniques and methods were used to conduct online lectures interactively and effectively for the undergraduates. The lecture recordings and e-resources were provided to the students to facilitate e-learning. The results showed that the universities or the departments organized workshops or a training programme for both students and teachers to be familiar with online teaching, learning and assessments through different online platforms. A university teacher stated that “We try our best to conduct the online lectures effectively and interactively without delaying the academic schedule. But both the students and teachers face some connectivity issues, noise etc. in e-learning. So, we upload all the lecture recordings, PPTs and learning resources to the LMS”. Rameeza (2020) also notes that it is a very important fact that e-learning helps higher education institutions to conduct lectures, assessments, and other activities without delaying the academic schedule.

By applying the TAM theory, it was identified that all undergraduates provided positive feedback on perceived usefulness. According to the findings, the undergraduates accepted that e-learning is timesaving, cost-saving, and easy to access at your own pace. It was also found that most of the undergraduates believed that if the technical issues were solved, e-learning would be successful. Although the undergraduates found e-learning convenient, the respondents from four universities preferred hybrid learning except for the undergraduates from University of the Visual and Performing Arts. These students preferred to have the traditional method as they found their practical programmes difficult to learn via the online method. Therefore, the findings showed that the majority of undergraduates preferred to have the learning in a hybrid mode. This approach would allow students to attend traditional classes while also attending online classes to have a flexible learning environment.

## **CONCLUSION**

The results showed that there were challenges and opportunities faced by the undergraduates attached to the state universities in Colombo district in e-learning. In other words, the results of the study provided an understanding of students’ experiences with challenges, opportunities, and the perception of e-learning. Therefore, the majority of the undergraduates attached to all the state universities emphasized that e-learning is the best alternative way of learning during the covid 19 pandemic and socio-economic issues in the country such as fuel crisis, power cuts etc. Therefore, the results also showed that the majority of undergraduates have a positive attitude towards e-learning. Moreover, it was identified that all undergraduates are willing to accept e-learning.

The undergraduates accepted that e-learning is timesaving, cost-saving, and easy to access at your own pace, but the technical issues should be solved to have a proper e-learning system. Factors that contributed to students’ negative experiences were unease with the connection to the internet, the cost of data and ICT equipment, a noisy environment, and a lack of interaction with peers and teachers, health issues such as eye issues, anxiety etc. This shows that the challenges of e-learning mainly occur due to the issues connected to ICTs.

Therefore, the findings of the study could be used to provide a more effective e-learning system. This study suggests that necessary action should be taken by the government to improve the ICT infrastructure and resources. Data facilities should be given to the students. With proper measures taken to address the issue of a lack of devices, the government could offer a special incentive or reward system to motivate the use of technology. Moreover, bandwidth and network systems should be improved. The findings showed that the majority of undergraduates preferred to have hybrid learning. Therefore, it is important that the state universities make the arrangements to have flexible and convent learning for undergraduates. The hybrid learning allows undergraduates to attend traditional classes while also attending online classes, reducing transport issues, expenses and optimizing ICT resource utilization.

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