Exploring Factors Influencing the Need for Incorporating Blended Learning in Technology Education Programs in Nigeria

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Abstract: *Blended learning as a teaching method that uses technology to offer a more individualized approach to learning, allow students to control the time, location, place, and step of their learning. In this regard, this paper explores the need for blended learning in teaching and learning technology education courses at universities in Nigeria. A qualitative approach was used in data collection using experts among university lecturers in North-eastern Nigeria as participants. To achieve an unbiased distribution, 19 experts were purposely nominated (based on their qualifications, work experience, rank and area of specialization) for the research across universities in north-eastern Nigeria. The data collected were transcribed, organized, coded, categorized and inductively analysed via an exploratory content analysis technique. The findings include, among other things that factors that influence the need of blended learning for technology education programme at Nigeria universities is due to its time and cost effectiveness, flexibility among others.*

Keywords: Blended learning, Face-to-face, Online, Technology Education, Technology education programme

1. Introduction

Blended learning (BL) is a natural development to the growing accessibility of eLearning, online resources and the continued need for a human component in the learning experience. BL according to [1] refers to the combination of face-to-face and online interactions which is technology-mediated teaching. Taking into cognizance of the advantages of adopting BL in higher institutions, it is sufficient to note that if institutional blended learning strategies can be planned to respond simultaneously to the needs and dynamics of all three groups (institutions, faculties, and students), mixed learning can be a powerful means of transforming those institutions.

In the case of institutions, research evidence according to [2] have shown the explosive growth of BL and acknowledged that BL could in the near future become the only means of teaching and learning in higher institutions. Similarly, [3] opined that educational and non-educational institutions may be wise to transform their pedagogy towards a blended learning instruction. This is to benefit from the advantages of both traditional and online teaching strategies.

On the other hand, [4] posited that if BL's are to be adapted to higher education institutions like in universities, definitely will contribute towards enhancing student learning, and faculty needs to be reinforced and encouraged to make the best use of the available technological tools. The adoption of BL in tertiary institutions of learning in developing countries like Nigeria would trigger the transformation of these institutions towards academic excellence. In Nigeria, BL is needed in allowing access to current world-wide conventional education which is yet to be put into action in the country. This is despite the fact that researchers like [5] emphasized on the Nigeria higher institutions of learning to incorporate ICT into their education sectors with a view combining the existing traditional face-to-face learning with the current technology-mediated online interaction. Accordingly, this qualitative research explores the benefits of integrating BL which served as the factors influencing the need for incorporating BL in Technology Education programs in Nigeria universities.

2. Literature Review

Apparently, BL courses have been recognized to be amongst the known choices for students as it allows learners and faculty to take benefit of much of the flexibility and convenience of an online lesson while retaining the advantages of the face-to-face classroom interaction. In this regard, [6] infers that in BL courses there exist of high dialogue, flexibility and learner self-sufficiency regarding the transactional distance which allows the lessening of transactional distance perception among members of the community. The benefits of BL allow an individual to combine and match based on the needs of the individual. These benefits of BL increase the feeling of connectedness and intimacy of the students to the institution community. This is because online lessons are asynchronous (they are student-controlled in terms of time and place) they offer flexibility and the chance for more independent, student-centered learning [7]. However, courses that are synchronous (those that provide real-time face-to-face interaction at a scheduled time in a shared physical location) gives learners and teachers possibilities for more in-depth discussion and

more accountability for learners.

In line with the above assertion, [8] maintained that in asynchronous there exist of student-student and student-teacher interactions continued to exist through the community as a follow-up of face-to-face sessions. Moreover, by linking the influence of synchronous and asynchronous activities in a synergistic relationship, BL has the potential to transform higher education [9]. This is because online interaction can improve the effectiveness of the evaluation process by the instructors. In this regard, [10] maintained that BL is becoming a popular method of education as it is applicable to any course that combines both online and traditional face-to-face instructional learning technique. This combination plays a vital role in transforming the educational standard of an institution because in BL there is a reduction of time for lecturing in class as some of the lesson content were moved to the online interaction. On the same vein, [11] infer that in BL there is an effective alternative instruction that replaces using only textbooks.

Building on the above, [12] recommend that with BL courses students can have more time flexibility revisit what they were taught during the face-to-face lessons to work together through online group activities to involve in a realistic problem-solving. And also, Park et al further stressed that with BL courses learners used to have an online discussion as a substantial learning activity of their lessons designed to make the students share understandings, perceptions, and standpoints related to topics without the time and place limits. This is because BL refers to the aligning of online and face-to-face learning with a lesser class time [13]. Accordingly, [14] argued that in a recent time e-learning replaces online courses because it can be used as distance learning and/or flexible learning and can also use with face-to-face learning usually identified as BL. In line with this replacement, [15] summarized the features of e-learning as that learning is self-centered and learners are not bounded by time. In this regard, BL approach was usually used to present concepts and theories to offer more time for discussion in the classroom and give more chance for the learners to revisit same online.

Based on the [10] recommendation, he said that BL provides both functionality and flexibility across a diversity of courses as such the students could recognize flexibility by working autonomously, and with all level of convenience indicating the strengths of the online instruction. On the same point, [7] revealed that in BL online courses are asynchronous so that they can be controlled by the student in terms of time and place. This means that BL gives flexibility and the chance of being more autonomous for students. Additionally, [1] viewed that with effective BL adoption classroom teaching experience or subject matter knowledge may facilitate quality face-to-face sessions, thereby facilitating creating effective online instruction and/or building the best use of face-to-face time versus time online.

Moreover, [12] found that BL could be classified in different backgrounds and approaches but it does not mean disagreement on identifying blended learning between the replacement of face-to-face time by online instruction and rather the blending of both approaches. Similarly, [10]

maintained that BL refers to incorporating the online and face-to-face environments to produce a more effective learning interaction than either approach can yield alone. For [9], combining the power of synchronous and asynchronous activities in a synergistic relationship, BL has the potential to change the education of higher education. More so, [16] propose 3 e-learning modules of engagement in the landscape of BL which include: standard course administration and student support; BL leading to important enhancements to teaching and learning method; and all of both modules to the level of modified instruction through different online courses and modes. Lastly, based on the [17] approximately 80% of college students in the U.S have taken at least a BL course, indicating the yearning for combined modalities to extend their engagement to learning.

3. Objectives and Scope of the Research

This research explores factors influencing the need for integrated blended learning in teaching and learning technology Education at Universities in Nigeria.

4. Methodology

This study uses a qualitative research method and the data were collected using 7-question semi-structured interviews. This form of the interview was employed because it provides the interviewees/experts chance to express their views based on the research topic. In view of this, According to [18] semi-structured interviews are used across disciplines because respondents are given the opportunity to spell out their perspective on the current research issues. The data were collected from nineteen (19) experts purposely/judgmentally selected from university lecturers in Northeastern Nigeria. The selection of the experts was based on their educational qualification, rank, area of specialization and working experience.

To this end, only senior lecturers that possess Ph.D. in one of the technology education courses (auto mechanic, construction, electrical electronics, and metalwork technology education), with at least 20 years lecturing working experience were selected. The interviews were based on the research objectives and comprise of two sections: Section A elicit information on the experts'/interviewees' demographic features and section B is the interview protocol on their perceived reasons of the need for integrated blended learning in technology education program. The interview questions were followed by probing questions that were raised and initiated in the course of the interview.

Conclusively, the outcomes of the data collected were transcribed, organized, coded and categorized and analyzed inductively [19] using a content analysis technique [20], with the aid of Nvivo software. This method was employed for the research because it is one of the qualitative methods used in the analysis of textual data [21] and, consequently, the data collected for this study is contextual data. Therefore, in the qualitative content analysis, the data gathered were categorized inductively [22].

5. Findings and Discussion

This section presented the findings and discussion of the findings achieving the objective of the study. In this interview, views of the experts were obtained about factors that influence the need for the blended learning in technology education program at Nigeria universities. Thematic analysis was used in analyzing the interview responses and the outcomes were transcribed, coded, and categorized into six subthemes. The participants were requested to speak out their knowledge, thoughts, viewpoints or opinions on the factors influencing the need for the integrated blended learning in technology education program.

Similarly, in firm obedience to the ethical subjects as guaranteed to the experts in this research, the researchers used a coding system of expert one (BL1) to nineteen (BL19) to represent interviewees. Tables 1-3 (Phase 1-3) presents the outcome of the qualitative data analysis based on seven themes enlisted below. BL1-BL19 signifies experts' classification, while theme 1–7 comes up from the analysis of the interview after transcription, coding, categorization and theme identification. The data analysis of the in-depth interview results produced six themes: (time and cost saving, extended research, flexibility, efficiency/effectiveness, online/face to face practice, students' engagement and personalization) as presented in Table 1-3.

Table 1: Phase 1 Summary of Factor Influencing the Need for BL

Participants	Theme 1	Theme 2
	Time and Money Saving	*Extended Reach*
BL3, BL8 BL5	Improved Time efficiency	Extended time with students
BL1, BL11, BL17	BL reduces classroom teaching time.	More opportunities for collaboration
BL2, BL10, BL13 BL18	BL allow students to reach more experts at a fraction of the cost	BL allow students to reach more people with high-quality content
BL6, BL15 BL19	BL reduces employee and instructor travel costs	With BL student learning can better be understood anywhere via performance analytics
BL4, BL7 BL12	BL is cost-effective	BL frees up knowledgeable instructors to offer more classes anywhere and anytime,
BL9, BL14 BL16	*BL offers better time management for teacher*	BL create more training content or work on other things anywhere and anytime.

In theme 1 (*time and money saving*), 3 participants (BL3, BL8 and BL5) admitted that BL if fully implemented in technology education programme *improved time efficiency;* for BL1, BL11 and BL17 experts blended learning *reduces classroom teaching time;* BL2, BL10, BL13, and BL18 stressed that blended learning *allows students to reach more experts at a fractio*n of the cost; BL6, BL15, and BL19 viewed that blended learning *reduces employee and instructor travel costs;* BL4, BL7, and BL12 perceived that blended learning is *cost-effective; and* BL9, BL14, and BL16

opined that blended learning *offers better time management for teacher.* These aspects of time and money saving benefits of blended learning as perceived by the experts served as contributing factor that influences the need for blended learning for technology education programmes in Nigeria tertiary institutions.

In theme 2 (*Extended Reach*), (BL3, BL8 and BL5) admitted that BL if fully implemented in technology education programme *extended time with students;* for BL1, BL11 and BL17 experts blended learning *More opportunities for collaboration;* BL2, BL10, BL13, and BL18 stressed that blended learning *BL allow students to reach more people with high-quality content*; BL6, BL15 and BL19 viewed that blended learning *With BL student learning can better be understood anywhere via performance analytics;* BL4, BL7 and BL12 perceived that blended learning is *BL frees up knowledgeable instructors to offer more classes anywhere and anytime; and* BL9, BL14, and BL16 opined that blended learning *BL create more training content, or work on other things anywhere and anytime.* These aspects of **extended reach** benefits of blended learning as perceived by the experts served as contributing factor that influences the need for blended learning for technology education programmes in Nigeria tertiary institutions.

Table 2: Phase 2 Summary of Factor Influencing the Need for BL

Participants	Theme 3	Theme 4
	Flexibility	*Efficiency/effectiveness*
BL3, BL8 BL5	BL is flexible in terms of availability	allows more effective interactions between the learners and their instructors
BL1, BL11, BL17	BL enables the student to access the materials from anywhere at any time	Better information and feedback on work
BL2, BL10, BL13 BL18	BL provides ultimate flexibility in presenting content	With BL teacher can efficiently and quickly deliver training to a broad audience.
BL6, BL15 BL19	Bl provide comprehensive training experience to learners	BL enhance the effectiveness of meaningful learning experiences
BL4, BL7 BL12	BL is by far the most flexible mode of training for adults	BL enhance the efficiency of meaningful learning experiences
BL9, BL14 BL16	BL Provides 24/7 access	A game-like environment coupled with immediate feedback and support motivates students to persist.

In theme 3 (*Flexibility*), BL3, BL8, and BL5 admitted that BL if fully implemented in technology education programme *is flexible in terms of availability;* for BL1, BL11 and BL17 experts blended learning *enables the student to access the materials from anywhere at any time;* BL2, BL10, BL13, and BL18 stressed that blended learning *provides ultimate flexibility in presenting content*; BL6, BL15, and BL19 viewed that blended learning *provide comprehensive training experience to learners;* BL4, BL7, and BL12 perceived that blended learning *is by far the most flexible mode of training for adults; and* BL9, BL14, and BL16 opined that blended learning *Provides 24/7 access.* These aspects of **Flexibility** benefits of blended learning as perceived by the experts served as contributing factor that influences the need for

blended learning for technology education programmes in Nigeria tertiary institutions.

In theme 4 (*Efficiency/effectiveness*), BL3, BL8, and BL5 opined that BL if fully implemented in technology education programme *allows more effective interactions between the learners and their instructors*; BL1, BL11, and BL17 experts viewed that with blended learning *there exist of better information and feedback on work;* BL2, BL10, BL13, and BL18 stressed that with blended learning *teacher can efficiently and quickly deliver training to a broad audience.*; BL6, BL15, and BL19 felt that blended learning *enhance the effectiveness of meaningful learning experiences;* BL4, BL7, and BL12 perceived that blended learning *enhances the efficiency of meaningful learning experiences; and* BL9, BL14, and BL16 opined that blended learning *is a game-like environment coupled with immediate feedback and support motivates students to persist.* These aspects of efficiency/effectiveness benefits of blended learning as perceived by the experts served as contributing factor that influences the need for blended learning for technology education programmes in Nigeria tertiary institutions.

online performance assessments in the classroom. These aspects of Online/Face-to-face practices benefits of blended learning as perceived by the experts served as contributing factor that influences the need for blended learning for technology education programmes in Nigeria tertiary institutions.

In theme 6 (*Students Engagements*), BL3, BL8 and BL5 opined that BL if fully implemented in technology education programme served as s*elf-pacing for slow or quick learners reduces stress*; BL1, BL11 and BL17 experts with blended learning *students have the ability to track their progress;* BL2, BL10, BL13, and BL18 stressed that blended learning *increases satisfaction and information retention*; BL6, BL15, and BL19 viewed that in blended learning *students can also learn through a variety of activities;* BL4, BL7, and BL12 perceived that blended learning *more engaged students; and* BL9, BL14 and BL16 opined that blended learning *increase student interest.* These aspects of students' engagements benefits of blended learning as perceived by the experts served as contributing factor that influences the need for blended learning for technology education programmes in Nigeria tertiary institutions.

Table 3: Phase 3 Summary of Factor Influencing the Need for BL

Participants	Theme 5	Theme 6
	Online/Face to face practices	*Students Engagements*
BL3, BL8 BL5	BL improve the quality of teaching and learning as it supports the face-to-face teaching approaches	Self-pacing for slow or quick learners reduces stress,
BL1, BL11, BL17	BL provides a transitional opportunity between fully face-to-face and fully online instruction.	Students have the ability to track their progress.
BL2, BL10, BL13 BL18	blended courses offer the conveniences of online learning combined with the social and instructional interactions	Increases satisfaction and information retention.
BL6, BL15 BL19	Students in online conditions performed modestly better	Students can also learn through a variety of activities
BL4, BL7 BL12	combining online and face-to-face elements had a larger advantage	More engaged students
BL9, BL14 BL16	Online performance assessments in the classroom	Increase student interest

In theme 5 (*Online/Face to face practices*), BL3, BL8 and BL5 stressed that BL if fully implemented in technology education programme *improve the quality of teaching and learning as it supports the face-to-face teaching approaches*; for BL1, BL11 and BL17 experts blended learning to *provide a transitional opportunity between fully face-to-face and fully online instruction.;* BL2, BL10, BL13 and BL18 stressed that *blended courses offer the conveniences of online learning combined with the social and instructional interactions*; BL6, BL15 and BL19 viewed that with blended learning *Students in online conditions performed modestly better;* BL4, BL7, and BL12 perceived that blended learning is *combining online and face-to-face elements had a larger advantage; and* BL9, BL14, and BL16 opined that blended learning

Table 4: Phase 2 Summary of Factor Influencing the Need for BL

Participants	Theme 7
	Personalization
BL3, BL8 BL5	Individualized professional development plans
BL1, BL11, BL17	BL design ways of continuing discussion themes and personalizing content to a person's specific job or interests.
BL2, BL10, BL13 BL18	BL result in improved individual student success, satisfaction, and retention.
BL6, BL15 BL19	BL provides personalization
BL4, BL7 BL12	With BL organization assesses the individual's talents
BL9, BL14 BL16	With BL organization draws a leadership development program to suit each individual person

In theme 7 (Personalization), BL3, BL8, and BL5 admitted that in blended learning if fully implemented in technology education programme there are individualized professional development plans; BL1, BL11, and BL17 said that blended learning design ways of continuing discussion themes and personalizing content to a person's specific job or interests.; BL2, BL10, BL13, and BL18 stressed that blended learning results in improved individual student success, satisfaction, and retention.; BL6, BL15, and BL19 viewed that blended learning provides personalization; BL4, BL7, and BL12 perceived that with the blended learning organization assesses the individual's talents; and BL9, BL14, and BL16 opined that with blended learning organization draws a leadership development program to suit each individual person. These aspects of personalization benefits of blended learning as perceived by the experts served as contributing factor that influences the need for blended learning for technology education programmes in Nigeria tertiary institutions.

5.1 Summary of the Findings

Based on the findings of this study as indicated in Table 1.0 above, a factor that influences the need for blended learning for technology education programme universities in Nigeria are as follows:

A) Time and money saving;
B) Extended reach;
C) Flexibility;
D) Efficiency/effectiveness;
E) Online/face to face practices;
F) Students engagements; and
G) Personalization.

5.2 Discussion of the Finding

Findings of this qualitative research include that experts were in the opinion that blended learning if fully planned and implemented at universities, management and lecturers of those universities would save time for teaching and running cost. This finding is in line with the recommendation of [23, 24]; that BL enables better enrolment and improved use of physical facilities by demanding less seat time than fully face-to-face courses and allowing higher student retention than fully online courses, thus decreasing time for completion of degrees. Similarly, [25] also found that BL learners have an additional option on how to manage their time.

Building on the above, the finding also correspond with [6] finding that if BL is fully implemented in school learners could re-access online the topics they treated anywhere and at any time they need to do so because ample time to work on the activities till the preceding face-to-face class. And also, for [9] the found that with the even partial implementation of BL there is a need to adopt an additional great policy specifying the decrease in scheduled classroom time by 25 to 50%. Also, For [10] BL if fully implemented is cost-effective in terms of erecting additional classroom and purchase of some facilities in addition to staff payment. Also for [7] from the viewpoints of college and university administrators, online lessons usually allow for improved enrolment, reduced costs, and overcomes lack of the facilities to cater the series of courses or students' enrolment per course.

Additionally, the findings of this research also include that respondents stressed that blended learning if fully incorporated and implemented yields extended reach for both instructors and students. This finding is in line with the recommendation of [26] that in BL institution-centered goals at times include the more effective use of resources in the classrooms as well as extending campus outreach. Also, [8] recommended that BL contents could be developed by ensuring that all members of the class could be reached by keeping structure low; that is by being flexible in making the content. Additionally, [10] found that it is strongly emphasized that the rationale behind using distance learning network is to reach would-be students.

More so, the findings of this study also include that blended learning is flexible in terms of teaching and learning. This finding is in line with the recommendation of [27], which a

BL environment utilizes any combination of asynchronous or real-time online instruction and face-to-face learning and gives instructors opportunity to come across learning objectives via learning activities in a more flexible and suitable way than traditional face-to-face class teaching. On the same vein, [8] found that wit BL it is essential to ensure that all staffers could be reached by being flexible in constructing the content. This indicated that students that will work with this flexible content in the online environment tends towards virtual learning communities of the online environment with a view to having an in-depth understanding of these content and to share/discuss same with group members.

Moreover, for [28], he found that with BL, it will be possible to cope with students having diverse prior education levels and to react to their learning needs; and providing flexibility in the building, enabling independence for students at a suitable level; and by supporting this independence the students could be able to organize their learning processes. Additionally, the finding is in concise with the finding of [12] that results students in BL courses take part more in small-group task online and chats with instructor and/or peers in terms of requirement of the course requirements due to the fact that students have more time flexibility in BL courses. With this flexibility, these students can revisit what they were taught from a face-to-face lesson to work together through online group work.

Furthermore, it was opined by the experts that one of the benefits of incorporating BL in the curriculum of technology education program involving that it is efficient and effective if fully and correctly implemented. This finding is in line with the recommendation of [11] that the traditional face-to-face approach to teaching and learning is not the most effective means of inspiring learning in the far-reaching group of students. It is also in concise with the finding of [25] that in BL, online courses provide the exclusive experiences of many learners living in a progressively worldwide economy and therefore could be an effective medium for teaching. In concise with this finding also, [29] that though in face-to-face learning students are not able to use the increased flexibility in planning their schedules with BL online learning take charge of that disadvantage.

It is seen that combining online with traditional classroom environments intensifies the learning efficiency of the students. Also, [12] maintained that BL approach upkeep student achievement which in turn make their schools' instructive services more effective and efficient. In adherence with this finding also [10] maintained that BL stands for incorporating the online and face-to-face instructions with a view to creating a more effective learning environment than either approach can yield alone.

Moreover, experts interviewed in this research were in the opinion that blended learning combines both online and face-to-face learning which resulted in producing a more effective learning approach than either approach can produce alone. This finding is in line with the recommendation of [30] that with more chances for teacher learning are delivered in web-based and online environments, it is imperative to make sure that their instructional quality is the same with traditional,

face-to-face learning. This indicated that while some educational institutions, adopted only face-to-face interaction in a classroom setting as the primary learning modality for their students, many other institutions, particularly larger universities and community colleges, have shifted to a blended learning. Linking this finding with computer-based learning, [31] posit that in computers interactive learning strategy learner are permitted to work with computer visual graphic design or animations linked to the topics under study. More so, research evidence like that of [32] shows that the use of an online community environment plays an important role in affecting learners' knowledge and attitudes. Also, the finding is in line with the assertion of [33] that BL is vital for a community that could be used in supporting online learning processes as well as interactions in the traditional classroom interactions.

Moreover, the experts felt that incorporating blended learning in higher education increases students' engagements to learning which in turn offer educational excellence. This finding is in line with the recommendation of [34] that BL offers effective faculty and course development support which minimizes the staffer's workload, leading to courses with richer student engagement which eventually improve student outcomes. The finding also corresponds with [35] that online interactions offer platforms for learners to engage in course material at their own time, which probably buoy up participation and learning in schools. Similarly, for [29] BL has been experimented with or adopted by schools or faculties that are interested in adopting both online and face-to-face strategies to improve learning outcomes of their students.

On the same vein, it is showed by [36] that using the online interaction like Facebook could be beneficial in ensuring the circulation and exchange of knowledge in lesser time thereby improving the support and collaboration among students. This is in addition to ensuring motivation and [37], increasing the engagement of the students in the learning environment and ensuring that this engagement continues [37, 38]. Similarly, [12] profound that with BL learners can be offered with real-time feedback on the progress of their learning which helps not only teachers in improving their instructive practices to improve learner engagement but also the entire institution in supporting students' achievement in individual courses.

The findings also include that incorporating blended learning in higher education give students the ability to engage in personalized work. This finding is in line with the recommendation of [1] that there is a need to effectively develop a structure that facilitates BL adoption with a view to facilitating the transformation of face-to-face courses to BL experiences to incorporate the best components of in-person and online learning. This according to [39] provide a means to producing learning in students who cannot attend classes in person and have been suggested as another learning patterns. Additionally, [12] profound that today's learners appreciate the value of learning management system (LMS) as digital learning environments which are mobile-friendly, highly personalized, and engaging learning experiences. Lastly based on this finding [10] considering e-mail as the fastest and most effective way of receiving information from a

teacher in which learners could be able to work independently, and with all level conveniences. These features require the student to post personal work back to the instructor for assessment.

6. Conclusion

As this study an exploratory research, it covers the benefits and advantages of blended which served as factors that influence the need for blended learning at Nigeria universities. Bearing in mind the criteria followed in selecting participants in this study it is sufficient to mentioned that these finding can be generalized and more elaborative study can be carried out for each of the course under technology education which includes Auto mechanic technology education, construction technology education, electrical/electronics technology education and mechanical technology education with more emphasis on auto mechanic which many research evidence indicated that lacked sufficient teachers.

7. Recommendation

Based on the findings of this study it is recommended that Nigerian government as a matter of urgency should incorporate blended learning at the university level with a view to reducing cost; reducing the time for teachers; giving both teachers and students ample and wider time to expand their search for knowledge. Moreover, if fully implemented, blended learning is efficient and flexible and effective.

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