LMOOCs（語学ムーク）の利活用に関する予備研究 －日本の大学生のOERs, MOOCs, およびLMOOCs認識について－

A Study on OERs, MOOCs, and LMOOCs for University Students: How Do They Perceive and Use Them?

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Keywords オープン教育リソース，ムーク，語学ムーク，デジタル学習，高等教育，研究法，教育評価，スライダー
OERs, MOOCs, LMOOCs, Digital learning, Higher education, Research method, Educational measurement, Slider question

ABSTRACT

本稿は，語学に特化したMOOC（略称LMOOC：massive open and online courses designed specifically for language learning）を英語カリキュラムに導入するための予備調査の結果を報告する。アンケート調査は2017年7月に東京を所在地とする大学の単一学部で行い，有効回答数70を得た。対象サンプルは情報通信技術（ICT）のスキルが高い学習者グループである点に特徴をもつ。データ分析の結果，1）オープンな教育資源（OER）に関する知識と利用は浸透しているが，MOOCとLMOOCに関する知識・利用は開発途上にあること，また，2）学生のデジタル学習に対する期待が，従来の学習方法のイメージや経験により狭まっている可能性を認めた。付随して，本研究ではアンケート調査の質問法にスライダーを採用し，その機能性も検証しているが，3）スライダーには妥当性ある統計処理の可能性が示唆された。結びに，LMOOCを用いた英語コースの設計に向けて，今後に期待される研究課題と実践研究を考える。

This paper reports on the results of an exploratory survey research regarding the readiness for massive

open and online courses (MOOCs) and those designed specifically for language learning (LMOOCs). The survey was executed in a single university in the Tokyo area in July 2017 and valid responses from 70 undergraduate students were obtained. The respondents are distinctive in that they presumably have high information and communications technology skills. The survey reveals the following: 1) the knowledge and use of open educational resources (OERs) are fairly spread but those of MOOCs and LMOOCs are still being developed, and 2) the students' notions of digital learning may have been limited by their previous traditional views/experiences of learning. As an exploration of the research method, the slider question format was included in the online survey, which gained a high usability. Potential validity to offset weaknesses of the convention is likewise observed. The paper also discusses future research and practices to implement LMOOCs in specific contexts.

1. Introduction

Massive open and online courses (MOOCs) have long become a critical aspect of our digital learning; however, studies focusing on language MOOCs (LMOOCs) or development of MOOCs designed specifically for language learning have only been conducted in recent years (Bárcena & Martin-Monje, 2014; Miyazoe, 2017). Accordingly, the current study examines the readiness for digital learning through OERs, MOOCs, and LMOOCs to advance research on and implement digital learning in specific contexts.

To capture the most common feature of this global learning, the term "digital learning" is used in this paper. The term includes various forms of ongoing learning, including PCs, the Internet, as well as other digital devices and systems. Such inclusion is underlined because learning could also take place offline. This choice of term coincides with the MIT's online learning initiative called, "Office of Digital Learning (ODL)" (https://odl.mit.edu/), which shares the same acronym as the older concept of ODL (i.e., open and distance learning).

In the current study, the following research questions will be examined: 1) How do university students in specific fields perceive and use learning opportunities related to OERs and MOOCs? 2) How adaptable are they to LMOOC learning? In addition, 3) the usability and validity of the relatively new format of collecting data in the online survey, namely, the slider question (as a possible alternative to Likert-type scales) is tested in this paper for further research endeavours.

2. Concepts in a chronology

2.1 OERs, MOOCs, and LMOOCs

Two research surveys and report of large scale executed under the umbrella of the Education, Culture, Sports, Science, and Technology (MEXT) are useful in capturing the grand view on the current state of importation and implementation of ICTs in education in Japan. One of these documents, AXIES (2014) examines the overall state of ICT use and implementation in higher education in Japan and overseas. Despite the availability of a more recent version of the survey (AXIES, 2016), the one in 2014 is referenced here because of its comprehensiveness and volume. Another report (AXIES, 2015) focuses particularly on MOOC use and implementation as compared with the states in other countries leading in these areas.

Table 1 is constructed on the basis of the above documents and other references to provide a tentative chronology of the concepts, systems, and platforms that represent the current socio-cultural transition in the knowledge of our learning. The table also aims to present the state of LMOOCs in

Table 1 A chronology of OERs, MOOCs, and LMOOCs

	Vision, system, platform	Year	Information source
Phase I OERs	OCW	2001	(MIT, n.d.)
	YouTube	2005	(DOMAINTOOLS, n.d.)
	TED Talks	2006 June	(TED, n.d.)
	Khan Academy	2006 Oct	(Wikipedia, n.d.)
	iTunes U	2007 May	(Apple, 2007)
Phase II MOOCs	Udacity	2012 Feb	(AXIES, 2015, p. 51)
	Coursera	2012 April	(AXIES, 2015, p. 51)
	edX	2012 May	(AXIES, 2015, p. 51)
	Futurelearn	2012 Dec	(FutureLearn, n.d.)
	OpenupEd	2013	(AXIES, 2015, p. 71)
Phase III Multilingualism	LMOOCs	2013	(Martín-Monje, et. al., 2013)
	JMOOCs	2013	(AXIES, 2015, p. 296)
	gacco	2014 Feb	(NTT docomo, 2014)
	Khan Academy Japan	2014	(GEJ, 2014)

the history of digital learning. The years in the table refer to foundation years (and months when available). Reflecting the progressive state of the melting and merging of genres and platforms, the categories and items are not meant to be exclusive and static. TED Talks has existed since 1984 but the date when the first six TED videos were uploaded online in 2006 June (TED, n.d.) is indicated. Given that the aim of the current study relates to LMOOCs for Japanese university students who learn English, those LMOOCs providing courses in English are the initial focus.

Phase I elaborates on the previous concept of open online resources that could be used for education such as open educational resources (OERs); Phase II includes those of more recent and massive types of online resources (MOOCs); Phase III includes those that are more language conscious or multilingual (in the current study, the Japanese version of OERs and MOOCs, and those targeting the language learning *per se*).

In a comprehensive literature review of related studies that were published during the period of 2012–2017, Miyazoe (2017) tentatively concludes that the concept of LMOOCs appears to have been proposed around 2013 by Martín-Monje, Bárcena, & Ventura. Despite the abundantly publicized research and practice related to MOOCs, much is left for further exploration on LMOOC research. Among the few pioneering LMOOC studies, a preliminary survey research by Mehran, Alizadeh, Koguchi, & Takemura (2017) that examines the readiness of online language learning in higher education is introduced in the present study given that it involves university students in Japan, which is likely closer to the one examined in the current study. Mehran et al. also provided a comprehensive literature review on e-learning readiness studies conducted over the period of 2001–2013 (the results can be found in the paper: Table 1: Studies on e-learning readiness for online language learning on page five) and reproduced a survey by Winke & Goertler (2008); this survey has been used in four prior studies. Both English original and Japanese translated versions are available as appendices in the paper. Mehran et al. conclude that ICT readiness of students is still being developed; however, in this study, the majority of the questions related to students' manageability of basic ICT skills (e.g., Q.13 asks if they can "cut, copy, and paste" in their document, and Q. 19 asks them to rate in a four-point Likert scale if they think iPods

are useful for their language learning). This condition differs considerably from the assumption from students in other contexts and specializations. Therefore, given the lack of prior research that examines readiness for LMOOC-like learning environments, the present study aims to elaborate questions of its own to explore the readiness of the targeted audiences. The unique aspect of this research is that some of the question items concern essential components of LMOOC courses, not ICT skills for general purposes. Consequently, this research will also identify necessary steps and elements for the incorporation of LMOOC into the design of language courses.

2.2 Online survey, slider question, and QR code

This research tested several methods to raise the response rate while ensuring the validity of the obtained data. Online surveys have their own merits over paper survey in several aspects, including protection of anonymity, ease of data handling, accessibility, and cost/time issues (Wright, 2005). In addition, the "mix-mode" of preparing paper and online surveys may also be a feasible option (Greenlaw & Brown-Welty, 2009) because response rates for online surveys are often lower than those of paper surveys (Nulty, 2008).

In the current research, the use of the slider question format is tested as an alternative to the traditional Likert-type scale. The Likert-type scale is a question format that measures attitudes or opinions on a specific topic from a respondent by asking them to choose the best fit among several fixed choices (Likert, 1932; McLeod, 2008). These choices can be three or four without a mid-point to reduce bias (Garland, 1991), or five, seven, ten, and so on. However, arguments have been made that choice formats cause difficulty in the higher level of statistics handling because it assumes that each choice is allotted evenly by the respondents, such as 0-50-100 (three), 0-33.3-66.9-100 (four), 0-25-50-75-100 (five), 0-14.3-28.6-42.6-57.1-71.4-85.7-100 (seven), 0-10-20-30-40-50-60-70-80-90-100 (ten). In addition to these issues, in a comparative study involving different languages, minor differences in the connotation of question sentences at linguistic levels could be another factor of inferring bias. Consequently, opinions are divided on the extent to which respondents could reply in some formats (Norman, 2010; Jamieson, 2004). To address this research dilemma, the usability and functionality of the "slider bar" (see, Figure 1), which allows respondents to decide their agreement level in integers from 0-100 (the numeric whose notion is shared widely beyond the difference of languages) is also tested.

Finally, to raise the response rate of the online survey format, this paper uses a quick response code (QR code) (Christensson, 2015) to assess its possible effects on the survey response rate.

3. Methodology

3.1 Method

The survey method was used to collect basic information that may be useful in the development of language curricula/courses using MOOCs and LMOOCs. An online survey was conducted using the online research service Survey Monkey (https://www.surveymonkey.com/).

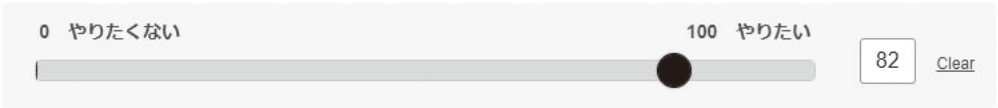


Figure 1 Response format of 0-100 slider bar in integer

3.2 Data collection

Two methods, namely, online and paper surveys were prepared to raise the response rate. The survey participation call was made in three English classes, all belonging to a single department (Faculty of Information and Environment), on a day in July 2017 toward the end of the semester. Printed copies of the survey were distributed to seek cooperation on which the following were printed: the typed-out URL for the online survey, the QR code graphics (these graphics can be created on a website offering free services for this purpose), and the estimated response time. Notably, the students could opt out without the knowledge of the researcher. Moreover, the researcher announced the invitation with the paper version in class to accommodate the students' preferences.

3.3 The survey

The survey consists of the following five sections (Appendix): demographics (Qs.1−3), knowledge and use of OERs, MOOCs, and others (Qs. 4−5); readiness for MOOC-like online learning environments (Qs. 6−11); preferences of digital devices for language learning (Qs. 12−15); and preferences of learning styles (Qs. 16−17), with free comment spaces on digital learning in general (Q. 18).

Each section is devised with a different focus. Questions 4-5 are devised based on the literature review above. In the survey, the items are placed randomly to raise the accuracy in the response. Questions 6−11 consist of reading information on the screen, discussions (or interaction with peers), and watching video lectures, in general and in English separately to determine the students' readiness for MOOC-like learning environments: these three components are selected as essential and common components in reference to the study by Sokolik (2014). Questions 12−15 are devised to ask what English skills the students wish to develop in general and with digital devices, as well as which digital device is most preferred in each situation: these questions thus determine if the kind of digital device has an effect on their adaptability to an MOOC-like learning environment. Finally, Questions 16−17 are devised to gain insights through their preferred learning styles in general and for language learning. Question 18 is provided to solicit free comments regarding digital learning in general.

The layout of survey is planned deliberately. Questions 1−5, 6−11, 12−15, and 16−18 are placed on separate pages to minimize possible interference in the response among sections. Nonetheless, the respondent could review all the questions before submission if necessary. When accessing the survey from a mobile phone, the page layout would be smaller and would have a different look. For gender Question 2 and for Questions 16−17, the alternative choice formats (e.g., male versus female, face−to−face versus online, and paper versus digital material) are avoided intentionally. Moreover, the slider format (Figure 1) is used for Questions 6−11. In the online survey, the respondent can provide their agreement level in integers from 0 (unwilling to do) to 100 (willing to do) by moving the scale from left to right. The slider format on Survey Monkey.com was launched in July 15, 2016 (Survey Monkey Audience, personal communication, August 12, 2017); that is, this exploratory research will provide novel insight. In the current research, the "numbered format" that provides the selected number in the rightmost square is chosen to make the testing of the effect of the slider bar more distinctive. For the paper version, the respondent would have to write down an integer number by hand.

The functionality and appearance of the online survey, the sliders, and the QR code, both via a PC browser and a mobile phone, were checked before the implementation.

3.4 The samples

As noted above, the respondents' ICT knowledge and skills are presumably higher than usual, considering the school's requirement that students have a PC of their own as well as with the wireless environment on campus and given their areas of study. In addition, approximately half of the respondents are required by the curriculum to have some experiences in learning via a tablet during their freshman year in their English language classes. Moreover, nearly all carry one (or occasionally two) mobile phone (s), with operating systems such as iOS and Android to check the functionality of the programs they are writing for their areas of study.

All the respondents were taking English courses with specific purposes (basic academic writing and research basics for scientists). The information on the course texts on Common European Framework of Reference for Languages (CEFR) B1−B2 provides an estimation regarding their English proficiency.

3.5 Analysis

All data are coded onto MS Excel and SPSS from online (automatic import data) and paper (manual transcription) versions of the survey and analyzed.

3.6 Ethical issues

The online survey was designed to be anonymous and involved free participation. This survey was irrelevant to the course performance evaluation of the participants. Prior consultation confirmed that the survey method was approved by the school's research ethics committee (https://www.dendai.ac.jp/crc/kenkyu/provisions/), presuming that it does not directly harm human bodies.

4. Results

4.1 Demographics

Among the 92 registered students, 71 participated in the study. Failure to complete all question items for some reason narrowed down the number to 70 for the final analysis. A total of 65 respondents answered the questions online, and 5 used the paper version. Among the 70 samples, with the default setting in the online survey preventing the respondents from skipping questions (except the one regarding gender), the collected data were complete without missing values or inconsistency. This allows for the assumption that the total valid response is 70 for all questions.

Figure 2 summarizes the demographic information. The majority of the respondents were sophomores and juniors, with a significantly high ratio of approximately 80% male; the majority of approximately 80% have computer-related specializations. With lesbian, gay, bisexual, and transgender (LGBT) sensitivity in education, the gender question is not forced but provides the third choice with free comment space; this set up resulted in one respondent adding comments of his "being male biologically," but is "bisexual in reality."

4.2 Knowledge and use of OERs, MOOCs, and others

Figure 3 summarizes the results of Questions 4−5 to consider the extent of the respondents' knowledge and usage of OERs, MOOCs, and other digital materials. Table 1, which presents the chronology of digital learning, is meant to correspond to Figure 3: the graph is laid out in chronological order by approximate date of foundation, with the assumption that the older materials would be possibly acknowledged and used more than the newer ones by the survey respondents. The terms OERs, MOOCs, JMOOCs, and LMOOCs without specific foundation dates are placed after the items in each

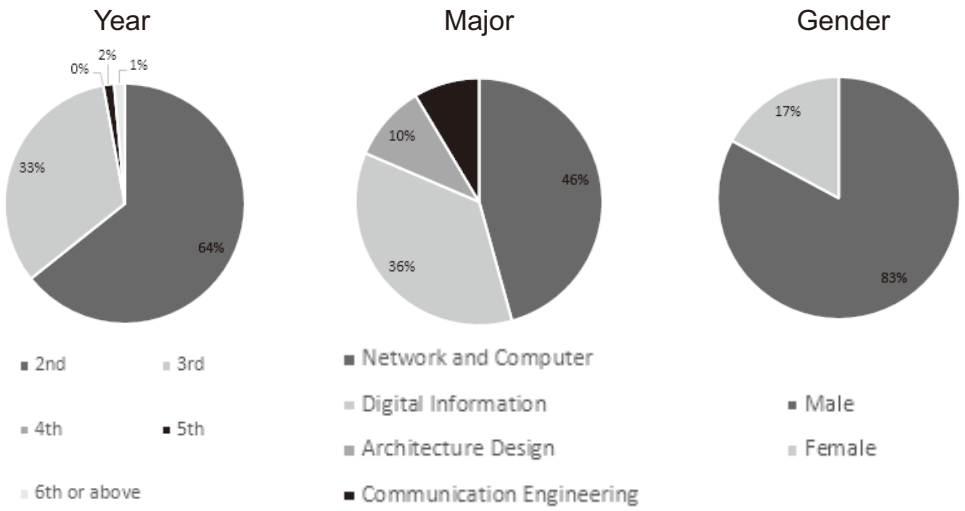


Figure 2 Demographic information of the respondents (Qs. 1−3) N = 70

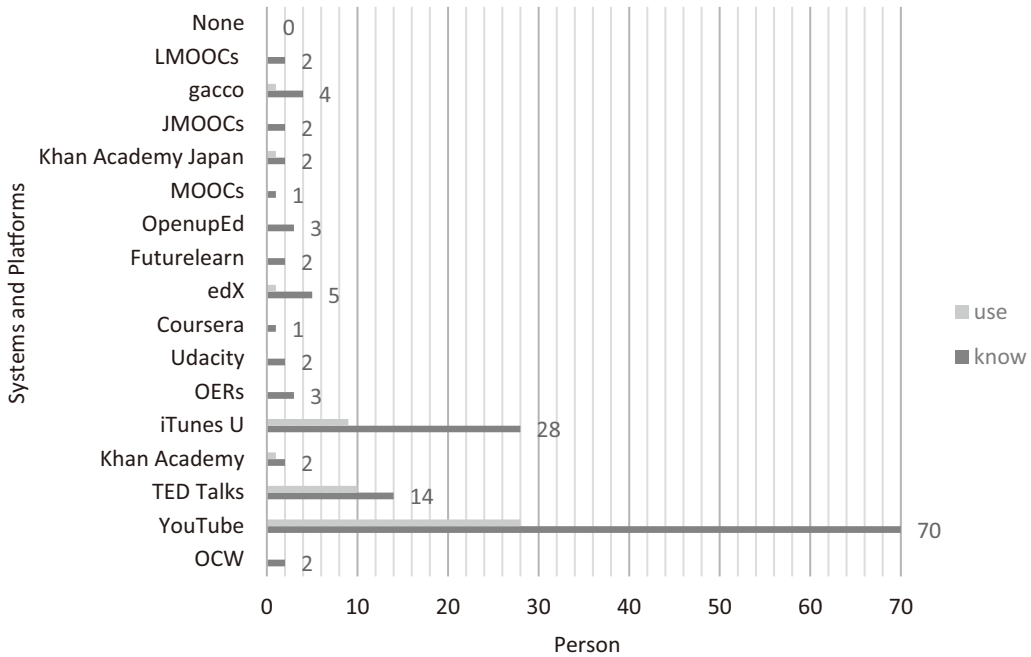


Figure 3 Knowledge and use of OERs, MOOCs, and others (Qs. 4–5) N = 70

phase because these terms are likely born as a summative expression of each phase as social phenomena. Light and dark gray express the use and the knowledge, respectively, of each concept of digital systems and platforms. Whether the respondents perceive each digital information carrier (e.g., iTunes and YouTube) differently or chronologically is unclear only from these data, especially when we jump seamlessly from concept to the other(s) by one click. However, it seems that

the students in this context appear to be adequately familiar with the use of digital resources in Phase I but have failed to acknowledge and use the more recent resources as clear entities (e.g., OERs and MOOCs in Phase II, even less LMOOCs for their learning in Phase III).

4.3 Readiness for MOOC-like online learning environments

Table 2 summarizes the results of students' willingness to use digital devices for the three key components of MOOC-like learning environments in the comparison between learning in general versus learning English/learning in English. A paired-sample t-test and correlation are also applied to determine whether the difference in each pair is statistically significant.

Overall, the average scores do not show strong willingness or unwillingness toward any of the three components. Nonetheless, the students appeared to be more inclined toward digital reading and video lectures, which could be more passive activities for learning than digital discussion, with the latter expected to demand a more active engagement. Moreover, they do not appear to be heavily discouraged when the linguistic tool becomes English. Even though all three pairs show statistically high correlations: Pair 1 ($r = 0.833$, $n = 70$, $p < 0.0001$); Pair 2 ($r = 0.826$, $n = 70$, $p < 0.0001$); and Pair 3 ($r = 0.802$, $n = 70$, $p < 0.0001$), the t-test shows that only the means of Pairs 1 and 2 are statistically significant. The high correlation suggests that their positivity/negativity to each activity might be inferred from/affected by their previous experiences in their native language(s).

To determine how the 0–100 slider worked, numerical data are classified tentatively into the following categories: responses by 10 increments, 5 increments, and 1 increment. For example, responses to numbers 0, 10, 20, 100, and so on, are coded into a 10-increment category; 35, 55, 65, and so on, are coded into 5 increments; and 91, 76, 33, and so on, are coded into 1 increment. The five samples (even if they are small) answered using the paper version of the survey are analyzed separately.

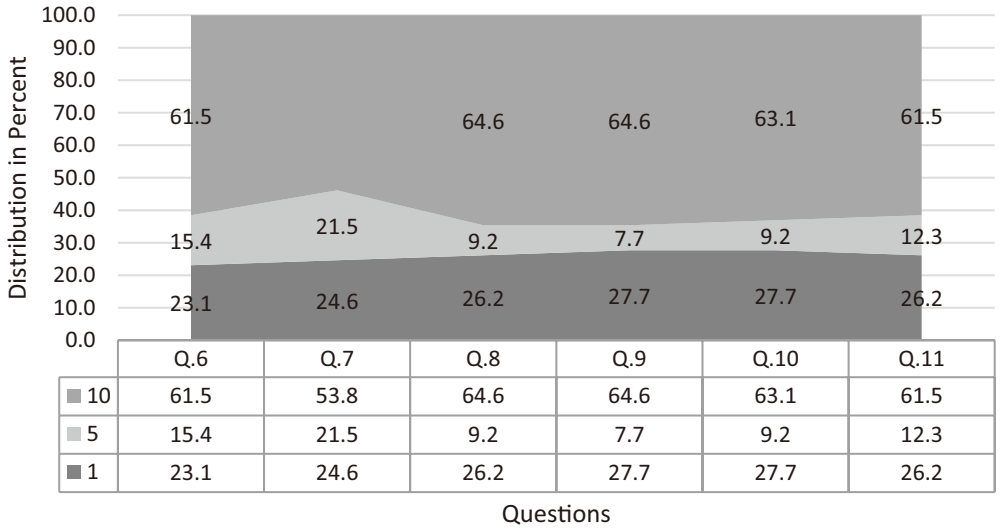
Table 3 shows the distribution of the three increment categories in the frequency made by responses through the online ($N = 65$) and paper versions ($N = 5$) of the survey. Figure 4 shows the graphic representation of the responses in percentage of the online version responses. The responses in the paper version were not converted into percentage but shown as frequency because of the small sample size. Although the respondents were asked to answer their engagement level in a 0–100 integer scaling, 60% adjusted their perceptions to be reasonably 10 increments; whereas approximately 25% of them chose the 1 increment policy. Thus, in this exploration, 0–100 integer scaling could extract a finer level of perception from respondents than the traditional Liker-type scaling. Moreover, despite the extremely

Table 2 Readiness for MOOC-like online learning environments (Qs. 6–11) N = 70

		M	N	SD	Mse
Pair 1 (Qs. 6 & 7)	Q.6 Screen reading	67.80	70	26.141	3.124
	Q.7 Screen reading English	61.23	70	28.540	3.411
Pair 2 (Qs. 8 & 9)	Q.8 Digital discussion	45.99	70	32.482	3.882
	Q.9 Digital discussion in English	40.77	70	32.805	3.921
Pair 3 (Qs. 10 & 11)	Q.10 Video lectures	65.53	70	29.439	3.519
	Q.11 Video lectures in English	61.83	70	32.735	3.913

Table 3 Response distribution in frequency by integer scaling 0–100 for Qs. 6–11 N = 70

		Q.6	Q.7	Q.8	Q.9	Q.10	Q.11
Online	1	15	16	17	18	18	17
	5	10	14	6	5	6	8
	10	40	35	42	42	41	40
Paper	1	0	0	0	0	0	0
	5	1	1	0	0	0	0
	10	4	4	5	5	5	5



	Q.6	Q.7	Q.8	Q.9	Q.10	Q.11
10	61.5	53.8	64.6	64.6	63.1	61.5
5	15.4	21.5	9.2	7.7	9.2	12.3
1	23.1	24.6	26.2	27.7	27.7	26.2

Figure 4 Response distribution in percentage of online survey by integer scaling 0–100 for Qs. 6–11

small sample size, the paper version of the survey yielded 5 or 10 increments only as their natural perceptions. The percentages of each increment category are somewhat stabilized in the latter half of the survey, with six consecutive questions. Although this finding shall be examined further with significantly larger samples, once the respondents decide their policy of perception measurements of their own after a few trials, they appeared to use the same policy for the rest of the questions.

4.4 Preferences of digital devices for language learning

Figure 5 summarizes the preferences of skills when learning English through a comparison between general situations and using digital devices. In this survey, the students appeared to be most interested in developing their speaking skills further, followed by listening, reading, and writing. However, when a specific digital device is involved, the order changes to listening as their first preference, followed by speaking, reading, and writing. The explanation for the change in the preference from speaking to listening when a certain digital device is used is unclear only from this survey result. The researcher presumes that the respondents could possibly have a vague idea of how they could develop speaking as an active skill if not guided at this time of research. Notably, although the "none of them" choice is also

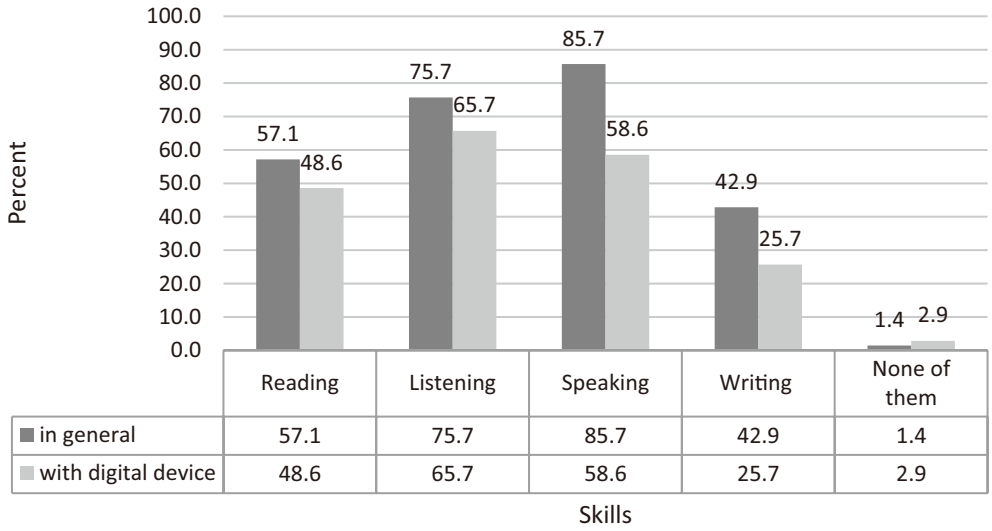


Figure 5 Preferences of skills in learning English (Qs. 12–13) N = 70

provided, only one or two students chose this option, thereby indicating that they hope to deepen their skills in English.

Figure 6 summarizes the comparison of preferred digital devices in general situations and when learning English. The preference order of the use of digital device is the same for both; PCs are at the top, followed by tablets and smart phones. Although the percentages for the use of tablets and smart phones for learning in general and learning English are the same (47.1% and 38.6%, respectively), the concordance rates of respondents who provide positive answers for both in the entire sample are 57.1% for PCs, 38.6% for tablets, 32.9% for smart phones, and 5.7% for none of them each; in other words, the percentages of 47.1% and 38.6% are incidentally the same, without any errors in the data handling or inattentive responses. In addition,

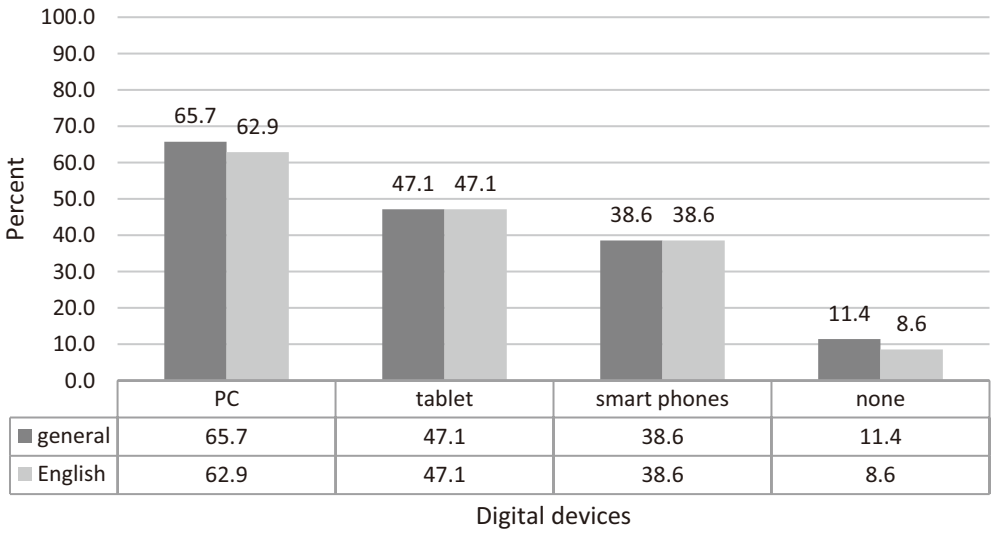


Figure 6 Preferred digital devices for learning (Qs. 14–15) N = 70

approximately 10% (11.4% and 8.6%, respectively) of students chose the option, "none of them", that is, they do not wish to use digital devices for their learning whatever the learning objects. Further insights will be made by combining these results with their responses to Questions 16–17 regarding their preferred learning styles.

4.5 Preferences of learning styles and free comments

Figure 7 summarizes the results of the learning preference in Questions 16–17 and shows a comparison of learning in general and learning English. The results indicate that for learning in general and learning English, the respondents preferred face-to-face, paper-based, alone, and lecture-type. For the laboratory course structure, a low rating for learning English is natural given that they have laboratory-type courses in the science fields; specifically, the combination of laboratory and language learning could be counter-intuitive.

Figure 8 shows the effect of avoiding possible dichotomy, such as face-to-face versus online, paper versus digital, and so on. The distribution of four patterns, namely, both (11), either of the two (01 and 10), and no preference (00), is calculated because logically, these four patterns should be inclusive. The most intriguing finding is that when they are given the preference (not as one or the other alternative but as a preferred choice), approximately 20% of students choose "both modes" (e.g., face-to-face and online, paper and digital, etc.) as their preferred learning styles. In addition, 40%–50% opted not to choose any, that is, "no preference," which could be interpreted as either option is also acceptable.

Finally, seven students left comments in Question 18, specifically on digital learning. Four respondents referred to the positive aspect of digitals, such as repetitive review possibility of videos, introduction of virtual reality, instant feedback, and off-line portability. Three respondents referred to the negative side, such as learning support that could only be obtained with humans, teacher's guidance, and difficulty in memorizing spelling.

5. Discussion

5.1 Summary of the findings

The following answers address the research

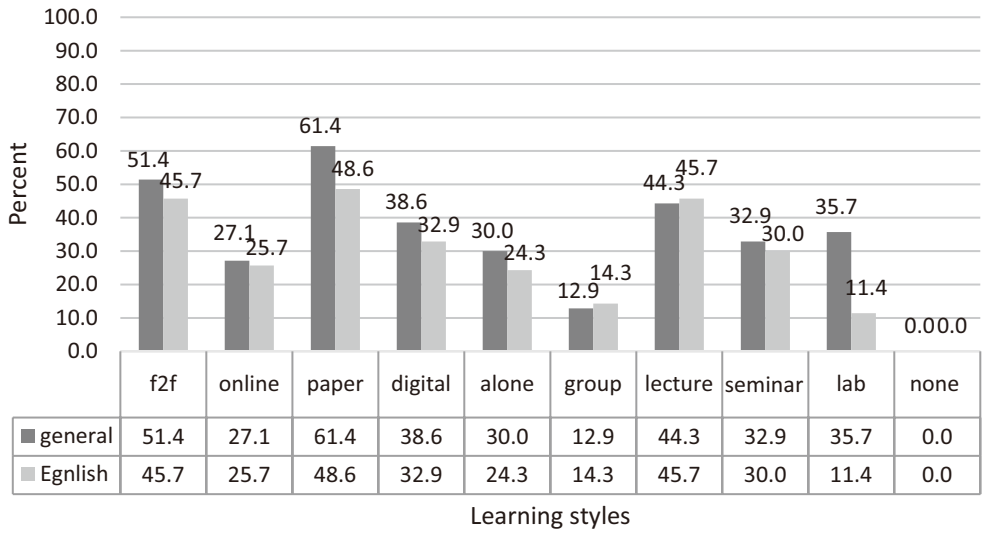


Figure 7 Preferred learning styles (Qs. 16–17) N = 70

	f2f/digital		paper/digital		alone/group		lecture/seminar	
General	34.3% f2f	15.7% both	35.7% paper	25.7% both	28.6% alone	1.4% both	21.4% lecture	22.9% both
	38.6% no pref.	10.0% digital	25.7% no pref.	12.9% digital	58.6% no pref.	11.4% group	45.7% no pref.	10.0% seminar
English	37.1% f2f	8.6% both	28.6% paper	20.0% both	22.9% alone	1.4% both	24.3% lecture	21.4% both
	37.1% no pref.	17.1% digital	37.1% no pref.	14.3% digital	62.9% no pref.	12.9% group	45.7% no pref.	8.6% seminar

Figure 8 Distribution of preferred learning styles (Qs. 16–17) N = 70

questions in this paper: 1) the knowledge and use of OERs are fairly shared, but those of MOOCs and LMOOCs are still being developed; 2) the students' notions of digital learning may have been limited by their traditional views/experiences of learning, and 3) a high usability and potential to offset weaknesses of the convention are observed when the slider is used.

5.2 LMOOC design elements

At this stage, the survey results show that the students' knowledge and use of MOOCs and LMOOCs are not high (Figure 3). Given their specialization in ICT fields, their unpreparedness for the knowledge of Phases II and III are unexpected. One possible assumption for this result is that high ICT skills and their use for learning belong to two different dimensions. The former, however, is a prerequisite for the latter. If it is, the traditional approach to examine readiness using certain tools would provide insufficient help. In short, use could induce knowledge, and *vice versa*. If instructed, students would attempt to understand the usefulness and functionality of certain digital materials, even if they require technically high ICT skills. Thus, the simple incorporation of recent digital learning objects may be enough without waiting for ICT skills to catch up with the necessity.

As for the three components of the interactive type of MOOCs, the students appeared to be more inclined toward the implementation of screen reading and video lectures. They were slightly less willing to digital discussion, regardless of learning objectives (Table 2). This finding could indicate that despite the students' lack of experience in MOOC merged courses/curricula and were uncertain about its implementation, they were adequately prepared to test it as a part-by-part learning experience.

More interesting is the fact that if they are learning English, they wish to develop speaking the most in general. For some reason however, listening is the most preferred with digital devices (Figure 5), whereas a PC was most preferred when learning (Figure 6). Combined with the above observation, once they gain experience in interacting with others (regardless of the language and possibly synchronously and/or asynchronously), their willingness to use a digital device to develop their productive skills (i.e., speaking and writing) may become more positive. As mentioned above, if their

past learning experiences are part of the reason that limits their perception of new learning modes, we could help students familiarize themselves with new learning modes by gradually incorporating the use of productive skills in our face-to-face classes.

The reason for their preference for a PC as desirable for learning remains unclear only from these data. Given that many of them use a PC for programming, designing on CAD, and so on (for their focus of study), the higher the complexity and larger amount of information to handle, the higher their possible desire to gain familiarity with a PC with high capability than a simple digital device. Direct comparison between this result and those by Mehran et al. (2017) is inappropriate given that the two studies utilized different digital literacy. However, the preference for PCs instead of simple digital devices is significant because approximately half of the students in the current research presumably experienced English learning using tablets. Therefore, their preference for PCs over tablets for language learning at the academic level could be supported by their former experience. Despite their somewhat limited expectation to develop English writing skills with digital devices (Figure 3), this expectation could improve significantly once they see the same merits of typing the language on keyboard as they do with a PC in their fields of study.

5.3 Implications of the research methods

In the current research, a few new attempts were included to overcome the weaknesses of research methods that the researcher has acknowledged in her research activities. The online survey was introduced via QR code and equipped with slider questions and the dichotomic assumption was avoided in the formation of survey questions.

The use of the QR code to raise the response rate appears to have worked well in the current research although strictly speaking, another comparative study with/without the QR code is necessary for this particular research aim. Even if the students can choose to use their laptops, many of them merely scanned the QR code using their mobile phones and answered the online survey very naturally. Whether this readiness is specific only to the current context or more or less a shared youth culture in the country remains unclear. Either way, the use of QR code appears to be a reliable patch to secure a high response rate for the online survey.

The use of the slider question format instead of the conventional Likert-type scales appears to have worked well. The arguments of 0−100 hypothetically equal division to rate their agreement level itself is linked to a sensible discussion on multi-culturalism. In some cultures, the format of "one, two, and many" choice may simply fit better (Pica, Lemer, Izard, & Dehaene, 2004). The numbered slider usage provides much finer information with high statistical validity for the purpose of the current study. We may be required to ask for a valid reason why the conventional categorical scaling is *better* than the slider if the former is chosen instead.

The avoidance of dichotomic format for gender issues and preferences of learning styles provided more nuanced information. Whether the paper version functions in the same way was unclear because of its effect in reducing anonymity. In any case, this openness in the survey response regarding gender choice is a first for the researcher. Moreover, as discussed in the course design section, the shift from dichotomic view of the world might lead to another world that has long existed yet somewhat ignored in education.

5.4 Limitation and further research

Given that the current study is at an exploratory stage, the survey results obtained from the students of a single focused study area in a single university are not applicable to those in different contexts. The results would become more insightful when

the students in this study could be compared with those of different specializations in varied contexts.

In this study, no strong negative factors to the components of LMOOCs implementation were observed. Therefore, the next step for further research is to plan a blended course that will include LMOOC elements and to investigate its effects on students' learning and possible changes in their perceptions of LMOOCs. The study will provide additional insight if it focuses on some features of LMOOCs — for example, asynchronous interactive components among participants, such as audio file exchanges by post for presentation practice — that are distinct from those of general MOOCs.

Another avenue for future research includes testing the use of slider bars with a large sample for the comparison of online and paper formats. For example, four groups can be set up: 50 online with Likert-scale; 50 with a paper questionnaire with a Likert-scale; 50 online with slider bar; and 50 with a paper questionnaire with slider bar. Ten question items can be prepared (in the current study, six), and the participants' responses can be compared. Similarly, the effect of using QR code to increase response rate could be tested through the simple comparative study of the four elements of with-and-without QR code and paper/online. As mentioned in the literature review, the issue of slider bar vs Liker-scale is an important topic in research methodology. Its use potentially raises questions about the *status quo* of what has long been done in a wide range of fields.

6. Conclusion

This study aimed to examine the extent of readiness of students for recent forms of digital learning within a specific context. Strong negative factors are absent for the implementation of LMOOC-based course design among the students included in this study. Instead, the current research found that the readiness for digital learning may be influenced by their prior learning experiences, regardless of learning contents. Hence, their sensitivity to various formats of learning can be expanded by providing various types of course designs (both digital and non-digital) because for them, the border between these types is becoming rapidly and increasingly seamless.

This study is meaningful in that it 1) has established a chronology of digital learning from the perspective of the global learning phenomenon (Table 1), 2) has shown the functionality of the slider bar question format as a potential alternative to conventional categorical scaling (Figure 4), and 3) has proposed a novel method for information collection beyond dichotomic world assumption (Figure 8).

The way we measure educational phenomena could restrict our potential approaches to educational improvement. It is my pleasure if this small exploratory research would help expand our limits to open up a new dimension for the future of education.

Appendix

Preliminary survey research on online learning (ver3)

Page 1
This survey is a preliminary research for the investigation of the perceptions of online learning by university students in Japan. The survey has 18 questions and has an estimated time for response takeoff approximately 5 to 10 minutes only. Your cooperation would be appreciated.

*Q.1 Let us know the first two digits of your student's ID number. (1)
Choices: 16, 15, 14, 13, before 12

Comments freely if any:

Q.2 Let us know your gender.
Choices: male, female
Comment freely if any:

*Q.3 Let us know your course of study.
Choices: Network and Computer Engineering, Digital Information Engineering, Architecture Design, Communication Engineering
Comment freely if any:

*Q.4 Please check the items that you have heard of (even vaguely). (You can choose more than one item.)
Items[(2)]: YouTube, TED Talks, MOOCs, Coursera, edX, Udacity, JMOOCs, gacco, Futurelearn, OpenupEd, OCW (Open Course Ware), OERs (Open Educational Resources), Khan Academy, Khan Academy Japan, iTunes U, LMOOCs, all are new for me
Comment freely if any:

*Q.5 Please check the items that you have used (even slightly). (You can choose more than one item.)
Items: YouTube, TED Talks, MOOCs, Coursera, edX, Udacity, JMOOCs, gacco, Futurelearn, OpenupEd, OCW (Open Course Ware), OERs (Open Educational Resources), Khan Academy, Khan Academy Japan, iTunes U, LMOOCs, all are new for me
Comment freely if any:

Page 2
The following questions concern your learning activities using digital devices such as PC, portable phone, and tablet. The questions are divided into two categories: those about learning in general and those about "learning English or learning in English."

*Q.6 How do you feel about reading sentences on the screen using portable phones, PCs, tablets, etc.? (Move the scale left-right.)
0 (unwilling to do) ---------- ---------- 100 (willing to do) ☐

*Q.7 How do you feel about reading sentences in English on the screen using portable phones, PCs, tablets, etc.? (Move the scale left-right.)
0 (unwilling to do) ---------- ---------- 100 (willing to do) ☐

*Q.8 How do you feel when you discuss on the bulletin board or SNS using portable phones, PCs, tablets, etc.? (Move the scale left-right.)
0 (unwilling to do) ---------- ---------- 100 (willing to do) ☐

*Q.9 How do you feel when you discuss in English on the bulletin board or SNS using a portable phone, PC, tablet, etc.? (Move the scale left-right.)
0 (unwilling to do) ---------- ---------- 100 (willing to do) ☐

*Q.10 How do you feel when you watch and listen to lecture videos using a portable phone, PC, tablet, etc.? (Move the scale left-right.)
0 (unwilling to do) ---------- ---------- 100 (willing to do) ☐

*Q.11 How do you feel when you watch and listen to lecture videos in English using a portable phone, PC, tablet, etc.? (Move the scale left-right.)
0 (unwilling to do) ---------- ---------- 100 (willing to do) ☐

Page 3
*Q.12 In learning English, which skill(s) do you want to develop? (You can choose more than one item.)
Items: Reading, Listening, Speaking, Writing, None

of them
Comments freely if any:

* Q.13 When you learn English using a portable phone, PC, or tablet, which skill(s) do you want to develop?
Items: Reading, Listening, Speaking, Writing, None of them
Comments freely if any:

*Q.14 Which digital device would you prefer to use when you study? (You can choose more than one item.)
Items: PC, tablet, portable phone (having smart phone functions), none of them
Comments freely if any:

*Q.15 Which digital device would you prefer to use when you study English?
Items: PC, tablet, portable phone (having smart phone functions), none of them
Comments freely if any:

Page 4
The following questions concern your learning style.

*Q.16 Check the items you like or you think fits your style of learning.
Items: face-to-face class, online class, paper materials, digital materials, study alone, group study, lectures, seminars, lab experiments, none of them
Comments freely if any:

*Q.17 Check the items that you like or think fits your style of learning English.
Items: face-to-face class, online class, paper materials, digital materials, study alone, group study, lectures, seminars, lab experiments, none of them
Comments freely if any:

Q.18 Please write freely anything regarding learning using digital devices.

Note(1): Questions with asterisks (*) should be answered and not left blank, that is, the respondents cannot skip these questions.

Note(2): To raise the comprehensibility in Japanese language, reading in Katakana is added in parentheses for those abbreviations in Alphabet.

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