The Needs of Information and Communication Technology (ICT) Tools for Research Development: A Case in Laos

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ARTICLE INFO	ABSTRACT
            	Recent advances in information and communication technology (ICT) have allowed humans to accomplish various tasks more effectively. This also applies to the quality of education, research, and development. For this reason, as one of the countries striving to improve the education system quality, Laos aims to leverage the ICT. As the empirical data on the ICT tools needed to achieve this goal in Laos is limited, this gap in extant knowledge has motivated the present study. Its aim is to examine the views of Laotian academics on the ICT tools and platforms needed, level of ICT usage, and required ICT training. The data for this quantitative study was obtained through a survey involving 11 participants who are directly involved in Building Research Building Social Research Capacities in Higher Education Institutions in Lao PDR and Malaysia (BRECIL) under the ERASMUS project. Subsequent analyses revealed that SPSS, Survey Monkey, Google Scholar, and Grammarly are among the tools academics need the most to support them in research. They also require plagiarism and grammar checking, dissemination and networking, and analysis and interpretation platforms. Most of the respondents also indicated the need for training on how to use ICT tools for analyzing research data. These findings can be used by the educational decision makers when formulating their strategies for introducing ICT tools and organizing training for Laotian academics on research and development.

1. Introduction

Technological advancements have shaped many aspects of daily life, including education. In line with United Nations (UN) efforts aimed at eradicating poverty in the world through Millennium Development Goals (MDGs) 2000–2015, information and communication technology (ICT) has emerged as a key area of development. This effort was then progressed with the establishment of Sustainable Development Goals (SDGs) in 2015 among member countries with a focus on economic, social, and environmental aspects [1]. The use of ICT in the education sector has also been intensified

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as a way of combating poverty. For example, in 2015, UNESCO approved the establishment of International Centre for Higher Education Innovation (ICHEI) to enhance the quality of higher education and expand education access in developing countries. Taking China as a model, it became evident that ICT can not only improve local conditions but can also strengthen cooperation between countries, thus improving the quality of teaching and learning [2]. It is important for higher education to align its practices with the total quality management [3].

Across the world, ICT is increasingly used in teaching and learning, especially in higher education, where various tools are adopted for content sharing, making presentations, research activities, and in communication between lecturers and students, while student enrolment systems are becoming commonplace [4]. As technologies are becoming more user-friendly, many of the modern tools can be used in research even by non-specialist users. Several scholars have examined the contribution of information technology to the research field, including Back [5] and Boyd and Crawford [6].

For example, the Internet provides access to a wide variety of resources that greatly facilitate research activities. It is already known that a wireless open-access research platform enables the researchers to gather needed information efficiently. As a part of their investigation, Ryberg and Marianne [7] reviewed pertinent literature to conclude that, with the help of ICT skills, the younger generation can become more competitive and creative, as the knowledge and skills can be acquired outside the classroom. Similarly, Els and Blignaut [8] found that students in higher education are using electronic file management as a part of their writing process. In sum, both students and researchers can benefit from the ICT.

2. Literature Review

ICT can be defined as a set of technological tools that include computers, Internet, radio, television, telephone, and other devices used to communicate, create, share, store, and manage information. As ICT can be used at anytime and anywhere, it has the potential to transform the education system by making the learning resources accessible to everyone. As a result, ICT has also made the research process more efficient.

One of the ICT devices that can help researchers is voice recorder, which can be used during interviews [5]. However, as the use of voice recorders has made researchers less sensitive and less focused on social subjects, there is a need for new data collection tools. For example, Boyd and Crawford [6] highlighted that the Big Data has made it easier for physicists, economists, and others to access and analyze large amounts of information. Thus far, ICT has been used mostly by the researchers in gathering and interpreting data, whether qualitative or quantitative. In quantitative research, the aim is to process large amounts of data to arrive at generally applicable numerical findings, whereas qualitative research focuses on people's experiences, beliefs, views, and thoughts related to specific phenomena or social contexts. According to Roberts and Wilson [9], although human experience cannot be computerized, ICT tools such as CAQDAS can still be highly beneficial, as they expedite the data analysis. Clearly, software cannot eliminate the need for human involvement, such as reading and gaining familiarity with the data to identify themes, but ICT tools can still assist researchers during analysis.

By relying on the ICT tools during the data gathering phase, researchers can save both time and costs. Nowadays, researchers are increasingly relying on online surveys, as this also expands the participant pool at no additional cost. Most importantly, the ICT tools can prevent data loss, while simplifying the data transfer for further analysis. More recently, Strutynska and Umryk [10] found that most of Ukrainian PhD students used Google Scholar followed by ResearchGate for finding relevant sources for their studies. Google Scholar, introduced in 2004, is using unique algorithm to

find relevant resources, such as articles, books, and conference proceedings, which academic publishers, professional societies, online repositories, and universities have made available online [11]. By expediting the search process, Google Scholar also reduces the cost of conducting research. Thus, it is not surprising that high perceived usefulness and perceived ease of using the Google Scholar are prompting growing number of students to adopt ICT resources when conducting research [12].

ICT tools aimed specifically for qualitative studies, such as Qualitative Data Analysis Software (QDAS), are increasingly used to analyze data gathered via interviews, focus group discussions, and open-ended surveys, but are also becoming indispensable in data management [13]. This demonstrates that ICT tools are making every phase of the research process easier, from identifying research issues to formulating the hypotheses and conducting clinical trials, to finally publishing research results. Shewade *et al.,* [14] recently noted that using open access tools such as Dropbox, TeamViewer, and CamScanner for data sharing and storing is cost efficient, while improving data collection quality. These and other open access tools can save researchers time designated for travelling, training, monitoring, and supervision. Similarly, McCormick, Lee, Cesare, Shojaie, and Spiro [15] advocated for the use of social media such as Facebook and Twitter as a platform for recruiting participants and gathering data, especially for ethnographic studies. According to Asai and Kavathatzopoulos [16], however, while ICT helps in research development, it may introduce ethics issues, as the research setting might be harder to control. However, extant research on the risks associated with the usage of ICT tools as a part of research process is limited. Most of the available studies in this domain tended to focus on the effectiveness of ICT usage in promoting learning in the classroom [17].

Nevertheless, ICT use differs between developed and developing countries due to the much lower levels of ICT literacy and limited Internet access in developing countries. For example, in Laos, Internet penetration is considered low, as it was 34% in 2018, with 2.5 million users, compared to Malaysia (81%) with 26 million internet users and South Korea (95%) with 49 million users [18]. Based on these figures, Laos can be considered as semi-prepared for ICT usage in education. Hence, due to limited infrastructure readiness, implementing ICT in education and research might be challenging. To overcome these issues, efforts are being made to eradicate poverty in the country with the help of ICT projects, such as Jhai Project aimed at improving everyday living conditions through technology. However, the project's success is limited by inconsistent availability of electricity especially in the rural and remote areas.

As our world is becoming increasingly interconnected, developing countries need to be competitive in all aspects, including education. In this context, Open and Distance Learning (ODL) is seen as a catalyst for the widespread use of ICT in education. Nowadays, ICT tools are being used for learner support services in ODL, such as enquiry, tutoring, guidance and counselling services, library services, and more. Although ICT has been implemented in the ODL systems of many developing countries, such as Nigeria, Kyrgyzstan, Indonesia, and the Philippines, there are many obstacles and deficiencies, arising primarily from lack of skills and infrastructure, especially Internet access [19].

The literature review conducted by Khan, Hossain, Hasan, and Clement [20] similarly revealed that developing countries such as Pakistan face challenges stemming from the lack of commitment, resources, policies, and skills needed for effectively using ICT in education. To overcome these issues, efforts are being made in many developing countries to ensure that their people are competent to use ICT in education. For instance, Pakistani government is committed to expanding online learning and the usage of ICT in the country's education system. As a part of this initiative, Virtual University of Pakistan (VUP), which offers information technology-based studies, was established in 2002. In Laos, efforts are also being made to use mobile phones in education. These methods, however, need

to be assessed in terms of perceived usefulness, perceived ease of use, perceived enjoyment, and personal innovativeness. Available evidence indicates that perceived enjoyment is the strongest driving factor for students to use mobile learning, while personal innovativeness does not play a role in mobile phone use for learning purposes. According to Poong, Yamaguchi, and Takada [21], this can be attributed to the Lao culture, as people tend to avoid uncertainty and prefer to rely on the existing norms. Thus, it is evident that, for successful ICT adoption, in addition to enhancing the skills and infrastructure, it is necessary to understand the societal norms.

3. Research Methodology

In order to address the objectives of this quantitative study, data was collected through hard-copy questionnaires, which were distributed to 11 participants, who are Laotian academics that directly involved in Building Research Building Social Research Capacities in Higher Education Institutions in Lao PDR and Malaysia (BRECIL) under ERASMUS project (http://brecil.my). The questionnaire was distributed in September 2018 during the research meeting in Laos.

The main data collection instrument was a survey questionnaire comprising of four sections, respectively pertaining to the students' and academics' need for ICT tools, their perceived need for ICT research platforms, frequency of using ICT tools for research, and training needed on the use of ICT tools for research. When responding to the questions included in the first two sections, respondents were required to rate their level of need on a 5-point scale, anchored at 1 = "no need" and 5 = "very much." In Section 1, respondents were presented with a list of 30 ICT tools, while eight ICT platforms were provided in Section 2. In Section 3, frequency of using ICT tools was indicated on a 5-point scale, ranging from "never or almost none," "every day," "several times a month," to "at least once a week," or participants could select "other" and give a specific frequency. Finally, in Section 4, respondents were instructed to select all answers that match their views on the training needed on ICT tools for research. The list included "analyzing research data," "browsing internet efficiently to search journals," "preparing research presentations," "assessing articles feedback," and "communicating online with researchers." The completed 11 questionnaires were analyzed descriptively using the SPSS software.

## 4. Results and Discussion

As shown in Figure 1, Laotian academics primarily need SPSS, Survey Monkey, Google Scholar, and Grammarly. Similarly, nearly half of the respondents indicated an urgent need for Google and Microsoft Excel to assist them in their research. This is to be expected, given that Google is the most widely used search engine with the 80–90% market share [22]. Similarly, Microsoft Excel is essential for calculations, graphing, and creating pivot tables.

The remaining ICT tools listed in the questionnaire were not seen as particularly important by the respondents. For example, only 37% of the sample rated Blog, Dropbox, Google Drive, and OneDrive are important for their research, while 36% of the respondents felt the same about Prezi and ResearchGate. On the other hand, 27% felt the need for CiteULike, Endnote, Google Form, Graph Pad, iCloud, Mendeley, Microsoft PowerPoint, Survey Gizmo, and Webinar. Finally, only 19% of the sample were of view that Evernote, LinkedIn, Pool Everywhere, SmartPLS, Turnitin, Twitter, and Visio would greatly assist them in research, and only 9% stated that Facebook and Wiki are needed as ICT research tools.
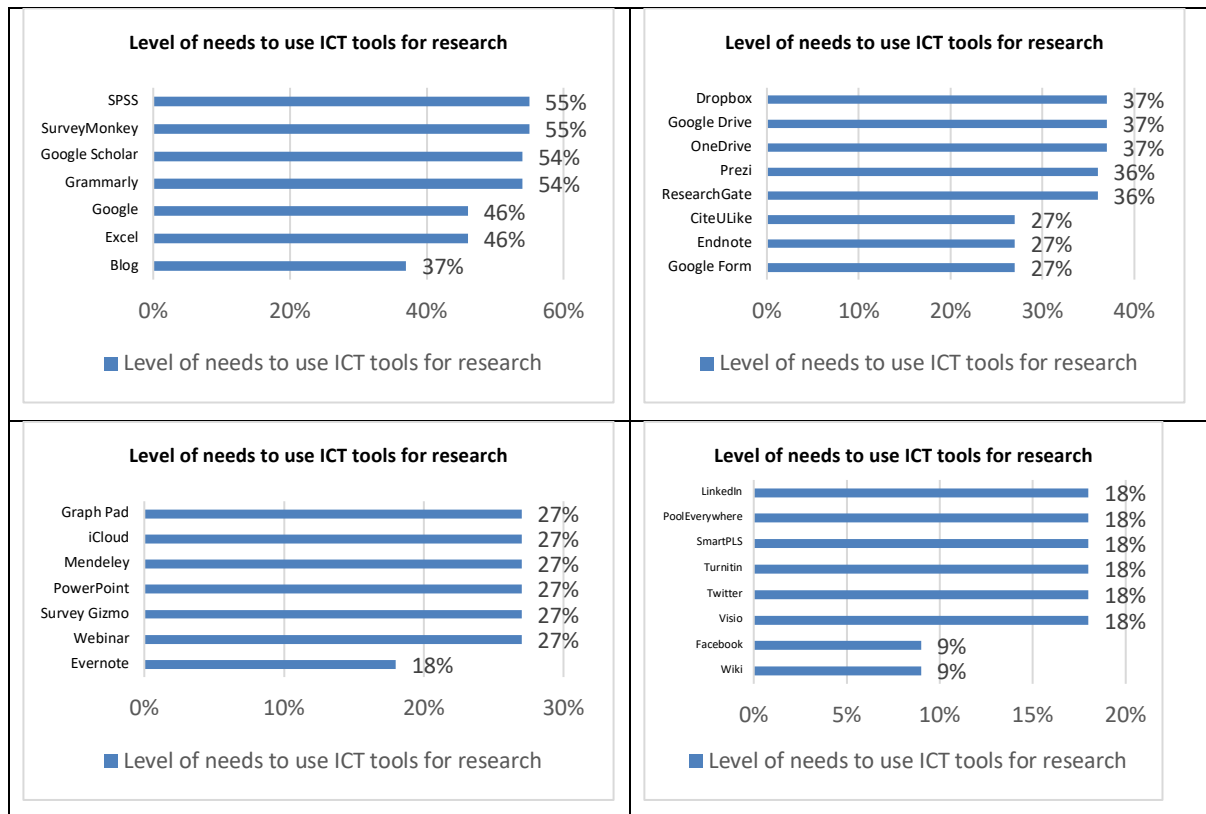
Fig. 1. Level of needs to use ICT tools for research

Respondents also rated different ICT platforms in terms of their value for research and, according to their responses, plagiarism and grammar checking (55%), dissemination and networking (55%), and analysis and interpretation platforms (54%) are most urgently needed, as shown in Figure 2.
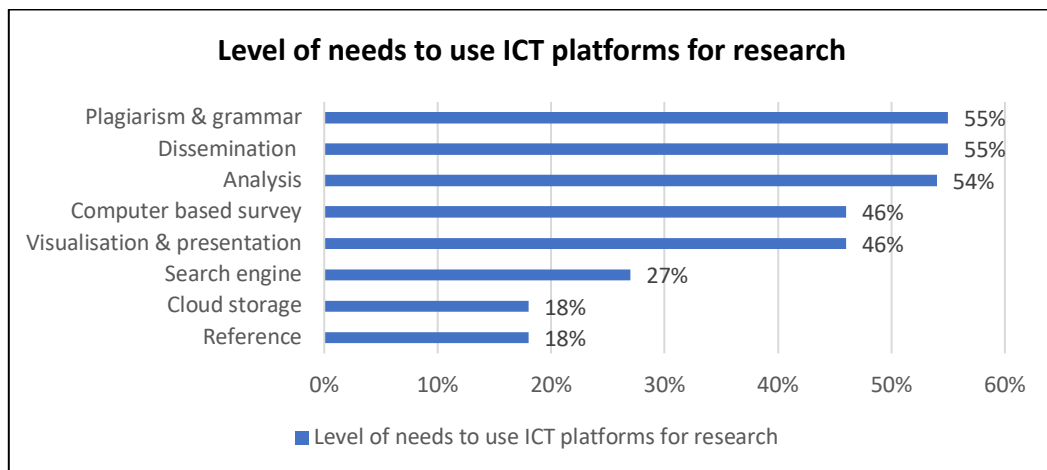
Fig. 2. Level of needs to use ICT platforms for research

As shown in Figure 3, 27% of the respondents stated that they use the ICT tools for research and development at least once a week or several times a month, while 18% of the sample use ICT tools every day. Only 9% of the respondents reported (almost) never using ICT tools for research and development.
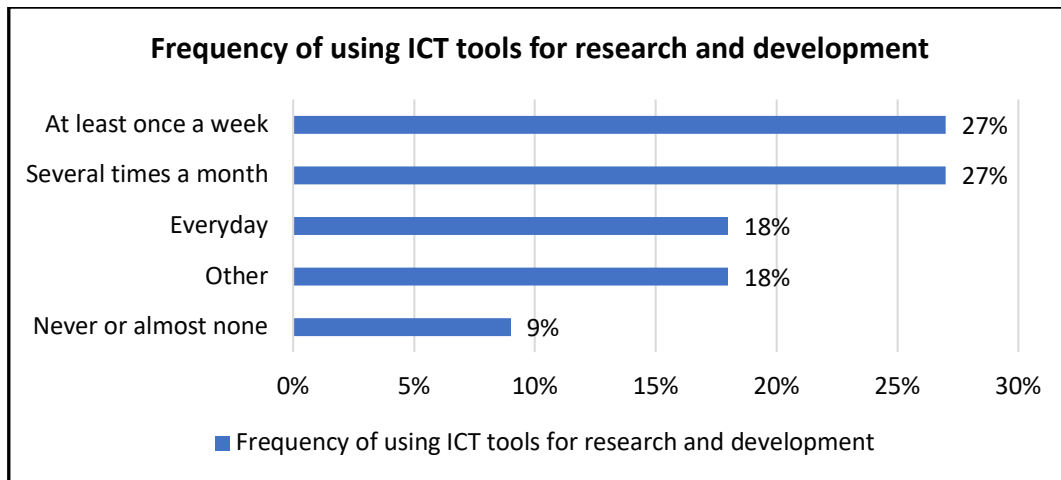
Fig. 3. Frequency of using ICT tools for research and development

According to Figure 4, 45% of the respondents feel that training is needed on using ICT tools for analyzing research data, while 27% stated that they need training on browsing Internet efficiently to search journals and articles, prepare research presentations, and assess colleagues' feedback. Moreover, 18% of the sample need training on how to communicate online with other researchers via ICT tools.
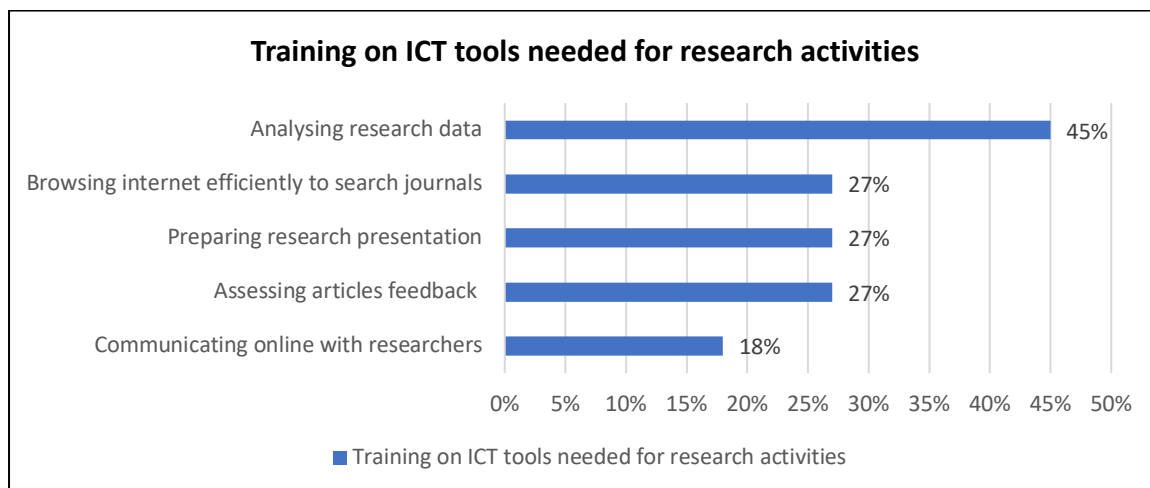

Fig. 4. Training on ICT tools needed for research activities

Based on the results, the Laotian academics are able to plan accordingly on the needs of ICT tools and training among them.

5. Conclusions and Recommendations

Based on the findings yielded by the present study, academics in Laos primarily need ICT applications such as SPSS and SurveyMonkey software to obtain research data. Respondents also indicated high need for information searching tools, such as Google Scholar and grammar checking applications. This preference can be attributed to the fact that Google Scholar is more accessible and covers more fields than other search engines, such as the Web of Science (WoS), as stated by Prins, Costas, van Leeuwen, and Wouters [23]. In addition, the use of ICT application may boost the skills and readiness of educators to implement the online learning [24].

The results reported here also show that most respondents need plagiarism and grammar checking ICT platforms. However, although there are many plagiarism checkers on the Internet, whether paid or freely available, Lao academics are facing some difficulties with using services that are available in English language only. Thus, they must rely on grammar checking platforms Thus, they must rely on grammar checking platforms, as indicated by Souriyavongsa, Rany, Abidin, and Mei [25]. Indeed, as English is not in focus of formal education in Laos, this results in relatively low levels of language mastery. Furthermore, educational curriculum is primarily focused on general English skills such as speaking, listening, and reading rather than writing [26].

Given the above, it is not surprising that only 18% of the respondents use the ICT tools daily. Computers are not widely available in Laos and even the usage of smart phones is among the lowest in Southeast Asia. According to available data, the main issue is small range fiber broadband [27]. This may limit the researchers' capacity for using ICT tools for data analysis.

In spite of the challenges, Laos is continually engaging in efforts to develop their research capabilities within the broader context of socio-economic development. The awareness that computers and ICT tools facilitate and enhance research has translated into action plans where Laotian educators make use of any opportunities to enhance their knowledge and skills on the use of ICT. Thus, the use of ICT in Laos in the context of education will increase in the future.

Acknowledgement

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