Collaborative Research between Malaysian and Australian Universities on Learning Analytics: Challenges and Strategies

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Abstract—Research on Learning Analytics is progressively developing in the higher education field by concentrating on the process of students' learning. Therefore, a research project between Malaysian and Australian Universities was initiated in 2015 to look at the use of Learning Analytics to support the development of teaching practice. The focal point of this article is to discuss and share the experiences of Malaysian and Australian universities in the process of developing the collaborative research on Learning Analytics. Three aspects of this will be discussed: 1) Establishing an international research project and team members, 2) cross-cultural understandings, and 3) ways of working in relation to the practicalities of the project. This article is intended to benefit other researchers by highlighting the challenges as well as the strategies used in this project to ensure such collaborative research succeeds.

I. INTRODUCTION

THE range of policies within universities and professional practices is globally increasing and the number of collaborative programs and research projects conducted by the professional researchers is also growing [1]. Consequently, collaboration between researchers and practitioners is becoming increasingly popular and shown in various forms [2].

In actual fact, the initial collaborative forms began in the 1970s as a result of federal government encouragement to build collaborations that would "overcome some of the weaknesses of large quantitative evaluations without being limited by the particularism of the single-site case study" [3]. Collaborative-research teams show the potential to bring different researchers together with diverse expertise and perceptions to address complicated social issues [4]. It is a good opportunity and platform to allow researchers to gain more insight from multiple perspectives within the research

team. Moreover, the collaborative research also helps to create a supportive environment that allocates workloads to enhance motivation and productivity, and promotes creativity among the researchers [5]-[7]. As a result, the outcome of the collaborative research will be more significant. In this model, researchers are encouraged to increase their capabilities to adapt and conduct research collaboratively and internationally with diverse groups of people in varied environments. This is one of the key factors in enhancing the education value and improving the decisions made in research [1]. Collaborative research is essential for achieving mutual understanding and assists researchers in discovering their own values and beliefs [8]. Moreover, collaborative research promotes construction of social capital in the form of trust [9] and enhances reflexivity [10]. Another advantage is that collaborative research is able to bridge the gap in international relations and lead to improvement for the researchers. Nonetheless, conducting research collaboration for academic purposes internationally can be challenging [11]. Other studies have identified that international collaborative practice is time-consuming, particularly during the early stages of the research process [1]. We, therefore, explored in this study our experiences of collaborative research project focusing on Learning Analytics between researches from two countries- Australia and Malaysia. The purpose of this article is to understand and share the experience, engagement and challenges of the collaborative research projects. The collaborative research was funded by a matching research grant sponsored by the Malaysian Research University Network (MRUN) and the Innovative Research Universities (IRU) grouping from Australia. In particular, the concept of collaboration was explored from the perspectives of project members of this collaborative research. The substantive research project aims to:

i.   Identify the range of Learning Analytics functions available in partner institutions which are related to teaching practice
ii. Identify the ways in which Learning Analytics can be used to improve teaching
iii. Develop a set of metrics based on Learning Analytics to improve teaching
iv. Test the set of metrics in improving teaching based on students' retention, students' engagement and students' motivation

In relation to these stated objectives, we also hope to assist other researchers with their collaborative research by sharing

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experiences [12]. As such, the focus is on researchers wishing to undertake research projects involving international collaborators. We share the challenges and methods of making the study more dynamic. This is because the contribution given by the researchers involved with their expertise will aid to create a collaborative and dynamic environment for improvement [13]. Herewith, we first explore the definition of collaboration and then provide details of our collaboration development process. We discuss the process in three aspects, which are establishing an international research project and team members, cross-cultural understandings, and ways of working in relation to the practicalities of the project.

II. Collaboration

Collaboration is defined as a mutual teaching–learning process undergone by team members [7] in which they work together and gain knowledge from their discussion on a key task. In addition, the government context shows incentives for enhanced productivity has motivated collaborative research projects [4] such as this one conducted between Malaysia and Australia. This phenomenon has increased the chances of collaboration among the researchers [14]-[16]. Some researchers also pointed out that 'most universities undertake a substantial amount of collaboration and, in general, the amount of collaboration has jumped substantially' [14]. In this regard, the collaborative research projects that were funded by a matching research grant project sponsored by the Malaysian Research University Network (MRUN) and the Innovative Research Universities (IRU) is one of the examples of international research in Malaysia and Australia that encourages more researchers to become involved in global collaborative research to enhance research development.

There are several crucial variables which have been identified as contributing to successful collaboration including wide-ranging planning; a flexible financial plan; informal power by the funding agencies; democratic management pattern; and regular communication [17]. Through ensuring that these are attended to the collaboration becomes more effective and productive. Additionally, negotiating a shared understanding of the application of the research knowledge and how this will be disseminated is also critical [18]. Communication skills are central to collaborative research because successful communication between researchers produces positive emotional energy or 'a feeling of confidence, elation, strength, enthusiasm, and initiative in taking action' [19] in which the research will be conducted smoothly and efficiently. On the contrary, the unproductive research groups may result in members having negative emotional energy and less motivation and engagement in subsequent collaborative research projects [19]. Nevertheless, collaborative practices 'have been overlooked in most discussions on methodological issues' [20] although other researchers stated that collaborative research is a common experience [20], [21]. Similarly, it is also affirmed that collaborative-research relationships are less known in the social sciences (for example, education) when compared to the natural sciences [22].

A number of investigations on academic research collaborations have clearly shown that the path to partnered success is quite challenging [11]. Bresciani proposes that 'simply defining collaboration is not enough to ensure collaboration' [23]. Therefore, Moje concluded that it was necessary for researchers to carry on the study on the research relations with the aim of identifying more opportunities for collaboration, 'rather than create a standard representation which serves to normalize and regulate our practices' [24]. In respond to this, we present our collaborative research experiences in terms of establishing an international research project and team members, cross-cultural understandings, and ways of working in relation to the practicalities of the project are discussed in the following sections with hope that these reflections will inform other researchers who may pursue collaborative research projects in the future.

III. Establishing an International Research Project/Team

Some researchers pinpoint the process of research team formation and structure, the selection of participants, the ways of data collection, and the methods of data analysis as vital [25]. In this research, the international research team was formed based on a matching research grant between the Malaysian Research University Network (MRUN) and the Innovative Research Universities (IRU) initiated by IRU and the Malaysian Ministry of Higher Education (MoHE)- MRUN is a network comprising five research universities in Malaysia: Universiti Malaya, Universiti Sains Malaysia, Universiti Kebangsaan Malaysia, Universiti Putra Malaysia, and Universiti Teknologi Malaysia. Meanwhile, IRU is a policy group comprising of six Australian universities; Charles Darwin University, James Cook University, Griffith University, La Trobe University, Flinders University, and Murdoch University. Amongst other criteria to secure the research funding a project must have at least one partner university from each network on the project. This Learning Analytics research project consists of members from Universiti Teknologi Malaysia, Charles Darwin University, Flinders University, Murdoch University, and Universiti Kebangsaan Malaysia. In selecting and establishing the international research team members, several areas of expertise were identified. As this research focuses on Learning Analytics and Student Information Systems (SIS) including students' retention, students' engagement and students' motivation, we searched for the team members that have relevant background in the followings areas:

i. Learning Analytics
ii. Information Communication Technology
iii. Educational Research including skills in analysing quantitative and qualitative data
iv. Educational Administrators in Centre related to Teaching and Learning in Higher Institutions
v. Student Information and learning system (for example, Learning Management System and Course Management System)

Each institution has a lead researcher and a team who work

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on the project. The numbers on the team at each institution vary however a total of 19 project members from two different countries comprise the international research team shown below in Table I.

TABLE I
RESEARCH GROUP

Country	Institution	Number of researchers
Australia	Charles Darwin University	3
	Flinders University of South Australia	2
	Murdoch University	2
Malaysia	Universiti Teknologi Malaysia	11
	Universiti Kebangsaan Malaysia	1
	Total	19

Building good relationships is essential but does present some challenges particularly as researchers are from different backgrounds and universities. The strategies we used to build the relationships mutual respect and to gain agreement on the project was to ensure we used a range of communication channels. These have built over time and varied in the course of the project. For example, in the lead up the approval of the project we have used letters of invitation, email, phone calls and video calls which attended to both content and process. Secondly, the relationship was further developed during the meetings in which the meeting date was always set and the process and progress of the research was updated in the meeting. Austin claimed that specific collaborative relationships evolve over time [15]. Correspondingly, John-Steiner also reported that collaborative relationships can evolve by doing a research project [22]. Our experiences would support this.

Additionally, for the purpose of formation and maintaining of a collaborative research partnership, there are two important interrelated conditions [26]:

i. Contextual conditions – the demands to create a supportive setting for the research project: meetings of the research groups and cooperation and support of the university. In this study, the researchers will spend three years to complete the research on investigating the use of Learning Analytics to support improvements in teaching practice with the cooperation between Malaysian and Australian researchers and consequently the meeting will be held frequently.

ii. Communicative conditions (in written or oral) –the enthusiasm of participants to be involved in open communication. Such interaction is referred by as 'communicative action' to reveal the truth [27] and to reach an unforced consensus [28]. In this study, the researchers often communicate with each other through email and other collaborative tools to update the research process and get the consensus in the discussion.

In conjunction with this, efforts are made by the researchers to build bridges among each other to collaborate internally and to make meaningful work alliances globally with the aim to successfully investigate the use of Learning Analytics in Australia and Malaysia. For example, the researchers in a collaborative relationship negotiate the various steps of the research process together. We not only respect and seek to understand each other' expertise and skills, time schedules and experience in research, but also try to maintain achievable expectations; knowing what is possible to achieve within the obtainable resources [1]. Lastly, trust is another important element in a collaborative project [29]. In this study, the researchers have been committed to this from the beginning. We believe in each other and this trust has enabled the researchers to communicate honestly and to listen to each other whole-heartedly.

IV. CROSS-CULTURAL UNDERSTANDING

Cross-cultural understanding is an important factor that needs to be understood by all parties. Cross-cultural issues not only arise among people from different cultural background but can also take place among people with the same background and in different situations. However, it mostly refers to the relationship between cultures where the different cultures come across and work together. Cross-cultural research is defined as the research that is carried out between or across cultures and consists of the research conducted together by different researchers from different countries [30].

Another purpose of collaborative research is to bring the world of research and practice closer together and to mingle between different cultures [31]. Nevertheless, Stephens argues that most of the time the culture and context are not paid enough attention in collaboration [32]. Thus, it might affect the project. It is also pinpointed by Hofstede that it is vital for everyone involved in international projects to have an awareness of differences in the culture and sub-cultures that exist between people [33]. For instances, people from collectivistic cultures such as some African or Asian societies, are educated to learn terms of 'we' to preserve harmony [34]. They are also taught not to show their individual feelings. On the other hand, people from individualistic cultures such as western cultures, are educated to learn the terms of "I" and express their opinions freely. They also emphasize themselves and select their own affiliations. In this regard, these different cultures might influence the international collaborative research. Moreover, cross-cultural collaborative research that includes the text construction or joint interpretation of data might be more trustworthy (or dependable) [35] as meanings are shared across cultures. Each researcher must respect the social and cultural institutions of the other researchers when the collaborative research is undertaken culturally. In this study, cross-cultural challenges have occurred in relation to interpreting and translating the scope of the research instruments when investigating the use of Learning Analytics to enhance the teaching practices. Cultural misunderstandings in research often involve how meaning is recognised and in how the meaning of words are defined [36]. To overcome the cross-cultural understandings, several steps have been taken into account:

i. Project members from each country will read and try to understand the research proposal by analysing the scope,

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terminology use in questionnaires and expected findings from the research.

ii. Several focus groups have been conducted by members from Malaysia to establish consensus on a few meanings that were misunderstood among Malaysia members.

iii. All queries on issues that were unclear had been emailed to members from Australia with the purpose of seeking for clarification.

iv. A focus group session among Malaysian members was conducted to understand the clarifications given by Australian members.

v. Open discussion in the face-to-face and online meetings took place between members from Malaysia and Australia to reach a shared understanding of the research before undertaking the next step in the research process.

This iterative cycle has assisted members from both countries in understanding any cross-cultural problems. As the project has progressed the researchers have become more aware of this issue and have paid greater attention to checking shared understanding of meanings. The focus groups sessions seek to be as open as possible so that valuable inputs from members from both countries will be received and appreciated. Brainstorming the ideas and solving the problem together in the team is our common way in this iterative cycle. In conjunction with this, voice tone and body language is also important to minimize cross-cultural misunderstandings. Some suggestions by experts to improve cross-cultural communication are [37], [38]:

i. Slow Down – Speak clearly and ensure correct pronunciation.

ii. Avoid Negative Questions – Ask questions that seek clarifications and avoid questions that end up with Yes/No answers.

iii. Take Turns – Listen, be patient and do not hurry.

iv. Be Supportive – Always be positive, give encouragement and build trust on the questions being asked.

v. Check Meanings – Be a good listener and summarize what has been discussed for further verification.

All of the above suggestions have been implemented in our meetings involving the members from both countries to solve the problem of interpreting and translating the scope of the research instruments. The original questionnaire used in Australia was seen, in several regards, to require amendment to suit the Malaysian context. For example, it was suggested that only a small group of people would have enough technical knowledge to answer questions regarding the technical information sought. As such, it was suggested that some questions be dropped from the questionnaire. In order to ensure this information was still captured in the project, it was decided that the related and unclear information will be collected by using other types of research instruments such as interview or email in Malaysia. Furthermore, there are some differences among researchers as followings need to be considered:

i. Personality of research members

a. Working style of members

b. Methods of communication among members

ii. Knowledge on research scope

a. Understanding of Learning Analytics itself including the scope of some terms such as; students' retention, students' engagement and students' motivation

Diversities in these areas must be respected and used wisely for the benefits of the research. Together, we have managed to take advantage of the diversity and are able to explore possible ways to execute the research as what has been planned. We manage the discussion between researchers via collaborative tools such as email, Dropbox and video calls. These collaborative tools have certainly helped to lessen both technical compatibility and technical issues of users operating on different computers [11] and help to bring the researchers closer together by frequently interacting with each other. In our study, different researchers have different personalities and thus the working style and communication skills among members are different. Hence, by using collaborative tools, the researchers can easily express themselves and work together as we use the same collaborative tools all the time.

The advent of these collaborative tools on the Internet has brought new opportunities for joint distributed research allowing these globally separated experts to easily share knowledge and have advantage of a wider range of funding chances [39], [40]. In our research, the researchers who come from different backgrounds and have their own different knowledge on research scope can share the knowledge together via collaborative tools. For example, the researchers' understandings of Learning Analytics including the scope of relevant terms such as "retention", "engagement" and "motivation" were quite different (although it took us a little while to recognise this). We have used the collaborative tools to discuss and clarify the proper meanings of those words. Another challenge is the area of Learning Analytics itself, where the term is new among Malaysian academicians while in Australia, the term is more familiar to university staff. Some of the terminologies related to Learning Analytics are also quite technical in nature, meaning that people without a background in ICT can find difficulties in understand their meaning. Besides those terminologies, other terms such as "permanent" versus "continuing" which does not come easily to the researchers, apparently for lack of exposure and resources in the area.

By using the collaborative tools effectively, these meaning of terms were clarified and discussed in details by the researchers in this study until consensus and shared understanding was achieved. The knowledge provided and shared by researchers via the tools constituted a new and different perspective for both parties [41] and then the meaning of terms was clarified. This phenomenon is also supported by the bestselling business book "Wikinomics", which has affirmed that collaboration is an advantage and in fact essential for education [42] to discuss the problem easily. The researchers also keep in contact with each other via collaborative tools such as video call and email to share and discuss ideas and progress on the project and to seek for advice from each other. By doing this, the challenges faced in this aspect of the differences among researchers were

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discussed and solved by the researchers effectively. Moreover, we stress the use of Dropbox which is the main collaborative tool and communication medium in our project where the researchers can update the process of the project and upload important documents and information. Dropbox has been an effective tool in helping us to follow the track of research development and negotiate with each other. We received

notification immediately when anyone of us updates the news and files in Dropbox regardless how far away we are or what we are doing. We can also provide our comments via Dropbox. Fig. 1 shows the parts of Dropbox we have used in our project thus far. The details such as what, when and who modified or uploaded the files are shown clearly in the Dropbox.
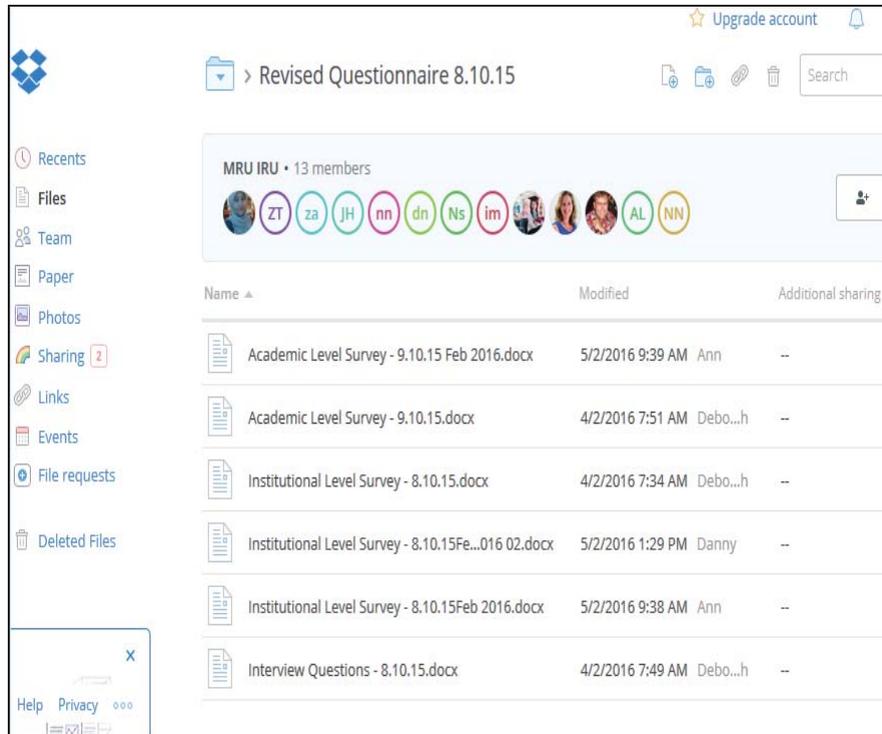

Fig. 1 Dropbox as a main collaborative tool in this research

V. WAYS OF WORKING PRACTICALITIES

Some researchers have reported that collaborative research across a distance is a challenging task, and that the best way to achieve success is to build a structured process collaboratively on which all researchers agree. This includes all parts of interaction; aggregated versus disaggregated use of data; data analysis, collection, and management; and ethical considerations [11]. In our research, after our international research team was established, this process began with an agreement by the researchers to discuss the ideas for the research outcomes together. We not only discussed the research instrument and made decisions together, but also collaboratively designed the research project to explore the overall situation of Learning Analytics and how it might improve teaching practices in Australia and Malaysia. After that, our team agreed to make a communication plan, involving how frequent, at what time, with what tools, and with what reasons communication would take place throughout the whole research process. This is essential because a progress timeline with clear action items is significant in developing the research. By doing this, it helps to solve the long distance research problem and limits the making-decision problems occurring in this research.

We have a shared purpose of working together on funded research projects to achieve consensus about the explanation and implication of the phenomena under investigation [43]. In order to achieve the early outcomes of our research, the pilot study of two surveys: Institutional Level Survey and Academic Level Survey shown below that we had to agree on the ways to solve a variety of challenges:

i. Institutional Level Survey piloted:
a. Most of the questions were acceptable but some of them needed to be revised and to be moved to interview questions.
b. In this way only few unnecessary questions needed to be dropped in the Malaysian context.
ii. Academic Level Survey piloted:
a. All questions were seen to be acceptable. However, some of the answers will need to be verified through interviews.
b. Unfortunately, no respondents in the pilot study agreed to be interviewed. Consideration now needs to be given to how this might occur in the next stage. It has been suggested that focus groups may be an alternative option.

In order to overcome these challenges in our study, we made decisions together to solve the challenges by exploring different scales of measurement and response types (for

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example, closed versus open ended questions). This was seen as one ways to make sure meaningful data will be collected successfully from novice users of Learning Analytics. Possible answers from respondents have been predicted and put as options that can be selected from a list by respondents. This type of scale can avoid unanswered questions by respondents, reducing the number of missing values in quantitative data analysis. It can also act as an alternative scale for open-ended questions.

Mutual respect is another way of working to make the research more successful. Isaacs highlighted that achieving a better understanding can create respect amongst participants where our team always shows the highest respect to each other [44]. Most of the productive and successful collaborative research cases show that individual researchers built their relationships with at least one other researcher in their research [4]. Mutual professional respect for each other is actually developed in our research team especially when we discussed some problems. Furthermore, in our study, the project leaders made contribution to form a communicative space by arranging meetings and leading these by having responsibility for the procedure [26] to create a communicative space to allowing the team to work effectively and strengthen the relationships among the researchers.

Lastly, in order to make sure researchers engage collaboratively and are successful, there are three basic ethical principles advocated in the Belmont Report: (1) respect for persons, and research subjects should have adequate information about the study, (2) beneficence, which needs researchers to evaluate threats and advantages of the research prior to conducting it; and (3) justice, which the researchers should make sure that research subjects are selected fairly [45]. For example, in our study, the researchers respect each other, assess the benefits of the research and make decision fairly when collaboratively developing the different phases of the research.

VI. Conclusion

Researchers and other professionals are encouraged to convene collaborative networks and establish research projects together [1] to achieve more significant outcomes. We are hopeful that reporting our experiences in our collaborative research will provide an informative resource for other researchers, mainly fresh collaborative ventures. We also help that our collaborative working might also assist other researchers to reflect on and explain their collaborative practice as the ways involved serve as a beneficial visual aid for further comparison and reflection in this vital yet often neglected field.

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