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Evaluation of the Impact of the Use of Technology – Rich Learning and Teaching Spaces on Student's Experiences of Teaching at the Centre for Inquiry – Based Learning in the Arts and Social Sciences (CILLAS), the University of Sheffield

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Abstract

Several impacts to staff teaching were identified by the study which included deepened engagement to teaching; transformation of student-teacher relationship; appreciation for adult spaces; learning innovative ways to teach; and access to wide range of learning technologies. Likewise, impacts to student's practices were reflected such as enhanced collaboration, communication and interaction; independent learning; increased socialization skills; adaptation of mobile roles; and digital learning. This study concludes that although flexible, technology-rich spaces like CILASS had positively impacted staff teaching and student's practices to learning, a more extensive research on impact evaluation on this topical area would be desirable in the future.

Keywords: Evaluation; technology-rich learning; teaching spaces; experiences.

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1. Introduction

One of the major activities of a university is to enable student learning. Traditionally, learning takes place in a formal environment such as classrooms and lecture theatres. A typical scenario in the last century of learning and teaching spaces would likely be designed as tutor-focused, one-way facing, with seating arranged in either a U shape or in straight rows. Alternatively, libraries and information resource centres provided informal environments for learning.

However, the emergence of information and communication technologies changes the notion of teaching and learning in the 21st century [15]. Likewise, learning and its relationship to place, time, and space evolved [21]. Learning is not anymore anchored on a physical (e.g. face-to-face) interaction but has expanded to a virtual environment as exemplified by e-learning and distance education.

As learning environments evolved, academic institutions also geared towards this development. In the UK, the Higher Education Funding Council for England (HEFCE) supported universities through grants as Centres for Excellence in Teaching and Learning (CETL). One of these universities is the University of Sheffield, which had been awarded as a Centre for Excellencein Teaching and Learning, thus the creation of the Centre for Inquiry-based Learning in the Arts and Social Sciences (CILASS).

This research will reflect upon the impact of the use of this particular CETL to teaching and learning. More details about this topic will be discussed on the section that follows.

Objectives

The main aim of this study is to evaluate the impact of the use of CILASS technology-rich learning and teaching spaces on student's experiences of learning and staff experiences of teaching.

The results of this study might provide CILASS and the University of Sheffield a useful summary of how well the space and technologies enhanced learning and teaching. Furthermore, this might help other Centre for Excellence in Teaching and Learning to identify better strategies and methods for evaluating learning spaces in the future. And finally, this study might also contribute to the limited literature on impact evaluation of new learning spaces.

For this aim to be achieved several objectives are set for this study as enumerated below:

1. To explore various experiences of students on their learning and staff on their teaching in relation to their usage of technology-rich learning spaces, both for their formal learning and teaching sessions, as well as for their informal use of it
2. To discover approaches in using these technology-rich learning spaces to enhance student's learning and staff strategies and methods of teaching
3. To conduct a review of relevant literature in order to establish the background of the study and identify an appropriate methodology for gathering data

2. Methodology

The research used a qualitative approach to explore the experiences of student's on learning and staff experiences on teaching on technology-rich learning and teaching spaces of CILASS. This approach was the most appropriate method of investigation since it allowed a deeper understanding of the social phenomena and its meaning rather than those obtained by using a quantitative approach [26]. Additionally, the use of qualitative approach on this topic provided a focus on seeking to understand the thoughts and behaviours of individuals who were asked to participate in the specific situation [1]. As [2] emphasized:Files

"...qualitative methods will be chosen in situations where a detailed understanding of a process or experience is wanted, where more information is needed to determine the exact nature of the issue being investigated, or where the only information available is in non-numeric (e.g., text or visual)."

Also, as the study aimed to explore the learning and teaching experience of both students' and staff alike, it was important that different perspective came from the point of view of participants in a qualitative approach in contrast from the point of view of researcher in a quantitative approach [5]. Accordingly, an interpretative approach and inductive design suited the study as it observed a phenomenon and allow reasoning to be carried based upon the evidence gathered.

The research used a purposeful sampling process in the selection of its interview participants. This strategy allowed an in-depth study of information-rich cases. As Patton (1987) stress that one can learn much about issues of central importance to the purpose of an evaluation through the use of information-rich cases. This study included a sample of staff participants from the faculties of the CILASS Project namely; Faculty of Arts and Faculty of Social Sciences. Few students were also asked to participate to represent views from student's perspective.

Since the study aimed to explore the experiences of staff and students alike in their use of the CILASS spaces, the sample was drawn from the list of staff that had booked the collaboratories for the school year 2007-2008 and had utilized the said spaces for their teaching. On the other hand, a student sample was represented by those who were observed to be using the CILASS spaces on their work as students during the time frame of the data collection from 9 to 30 June 2008.

The research carried out an interview with twelve (12) teaching staff from the Faculty of Arts and the Faculty of Social Sciences and also with three (3) students from the University.

The research made sure that data from interview participants would be kept strictly confidential for protection. To do this, responses from staff were identified using two letters 'Sf' and 'St' for students and followed by a number, for instance, Sf10 and St2. All data that were gathered would be destroyed after the completion of this study and a degree would be awarded.

All interview data were transcribed, coded, and analyzed. Transcriptions were carried out as soon as an interview concludes [5]. Since transcription is a time-consuming process, the study allotted a day for each

interview to be fully transcribed. Likewise, to avoid errors during the interpretation of data, Bryman [5] further recommends that an ongoing analysis be considered to become aware of emerging themes that might be helpful to ask on later interviews.

In addition, interview transcriptions were coded to represent themes, patterns, and categories, which were then used to analyse results of the study. Hence, a tedious and time-consuming method of data preparation, management, and retrieval, which were the integral components of data analysis, was avoided through the support of computer-assisted software.

3. Results and Discussion

The findings of the study identified six themes from the analysis of interview data. First, staff in general wanted students to work collaboratively; acquire range of skills including information literacy and deepen their engagement to resources; become independent researchers; and develop inquiry in their learning. Second, various approaches to IBL were applied in their teaching through group work; reflective thinking; work presentations; information literacy projects; and individual online research. Third, CILASS spaces' benefits, features, issues and problems, and space preferences were enumerated. Issues on technologies including training needs of staff come next.

Finally, the last two themes that emerged from the study, which deals on the impact of the use of the CILASS spaces on staff and students' experiences of teaching and learning revealed that staff had deepened engagement to teach; established student-teacher relationship; appreciated adult spaces; fostered innovative ways of teaching using technology; and considered the benefits of accessibility to multi-media learning tools. On the other hand, student's practices were impacted by becoming participative, independent, socially-skilled, mobile, and digital learners.

Impact to teaching

Engagement

One impact that was evident from the findings of this study on the use of CILASS spaces was engagement of staff to teaching. Staff admitted quite a few changes from the more traditional ways of teaching they were used to and gradually adopting appropriate teaching strategies as demanded by new learning environments. According to them, teaching in typical lecture theatres limit the possibility of injecting interactivity in class, in contrast to the new learning and teaching spaces of CILASS. For instance, some staff had revised their modules in order to deliver a more student-participated session such as poster presentations by groups of 3 or more. Such class activity which involved a group output was a way of motivating students to participate. This supports Sinclair [2] who stressed that collaborative projects for students should be aligned with the current pedagogy of learning spaces.

Apparently, one factor that motivates participation and engagement was the learning space that served as a suitable environment for the class activity that was cited as an example above.

This indicated that the CILASS collaboratories as teaching and learning spaces were utilised accordingly. Since staff were given the opportunity to teach in technology-rich spaces of CILASS, this enabled them to think of approaches that they never thought possible in conventional classrooms. As Oblinger [21] emphasized, "Spaces are themselves agents for change. Changed spaces will change practice."

An inquiry-based approach to learning as embedded in the CILASS learning and teaching initiatives [9] was adopted and practiced by most staff who had utilized the CILASS spaces for teaching, as reflected on this study. For example, IBL activities such as problem-based scenario sessions and online information-seeking tasks were integrated on the modules. The flexibility of the CILASS spaces allowed these activities to be achieved.

This positive impact of enhanced engagement is a manifestation of a well-designed learning space and a maximised usage of CILASS spaces. Furthermore, this revealed that staff has deepened their engagement to IBL and value it as a core pedagogical strategy, which answered one of the desired outcomes of the CILASS Programme.

Student and faculty relationship

One noteworthy impact of using the CILASS collaboratories was the ability to transform the relationship of staff and students. Staff perceived that the new spaces enabled them to facilitate students rather than teach them. This was owed to the flexibility of the spaces and access to technologies that allowed students to work independently. For instance, when students encountered difficulties of the tasks on hand, they tend to forget about the presence of their teachers in the classrooms, which should be the ones to assist them. Instead, they asked for help from their peers around. Perhaps this was due to the camaraderie that they had established in those spaces that made communication easier for them. Yet, teachers appreciated this behaviour of students since it showed that students were capable to learn by their own rather than depending much on their teachers.

Aside from providing spaces designed for formal learning and teaching purposes, CILASS had also included 'soft' spaces, breakout areas, and small-group rooms for informal use by students. This offered students a place where they could stay for extended discussions with teachers. In particular, the open networking area in Bartolome House was perceived by staff and students to be a "more grown-up space". Additionally, the provision of a coffee vending machine in that space was mentioned. As a consequence, a student-teacher relationship had been transformed. This supported [25] belief which states:

"A safe and trusting relationship between students and teachers can be greatly facilitated if the learning environment encourages learners and teachers to interact before, during, and after class meetings."

Since staff taught students that belong to the Net Generation of learners, which are experiential and tends towards learning by doing rather than listening [3], most staff admitted to learn from their students as well. In some way, this added to students' self-confidence knowing that they are capable of sharing input for the discussion. Likewise, staffs themselves see this as a challenge to find new ways of teaching and to encourage students to be more participative in class.

And so, this revealed that CILASS spaces were used as learning environments that helped changed the student-teacher relationship for teaching and learning.

Adult spaces

Cornell [11] implies that learning environments draw people in to stay especially if they felt valued in those spaces. Interestingly, this was the case in the CILASS collaboratories, which was perceived by most staff to be a space intended for adult learners. This had an impact to teaching and learning. Staff claimed that learning environments like the CILASS collaboratories had an effect on the way their students behave and respond to them in class. Students tend to become more responsive and active perhaps owing to the unconfined nature of the space. Students appreciated the fact that they were valued and treated like adult in these new learning environments. Moreover, these spaces made students feel in control of their learning as they find ownership of the space. This autonomy, in some ways suggested a positive impact to student's learning outcome.

It is essential that staffs can identify how their students behave in these technology-rich spaces from the conventional classrooms. These changes of student's behaviour could guide them perhaps in designing class activities appropriate for a more adult group of learners in the future.

Innovations

Given the opportunity to teach in the CILASS spaces had influenced most staffs to ponder on innovative ways of teaching. As space can either enable or inhibit learning (NLII, 2004), in a similar manner, different styles of teaching would also do the same. According to Cornell (2002), teaching methods of today put more emphasis on collaboration, computer use, and social learning so that teaching pedagogies change. True enough, staffs that had used the technology-rich spaces of CILASS acknowledged this on their teaching and had gradually changed teaching strategies and methods in designing modules.

Aside from designing sessions differently, another staff acknowledged the opportunity to align assessment approaches with teaching styles when using the CILASS spaces. This was supported by another staff that suggests for the university to consider making changes from the conventional style of assessment such as written exams into assessments aligned with new ways of teaching and learning.

It was remarkable to note in this study that majority of staffs perceived to learn innovative ways of using technology in their teaching. Presently, they admitted not having used the technology cleverly for teaching yet. Hence, almost all staff expressed a desire of attending conferences that would tackle issues about using technology innovatively in class. For example, case-study type of presentations on technology-added value to teaching may be considered. Learning from other people on the range of ways that technology could be effectively integrated to teaching was also suggested.

And so, this impact indicated a step taken in achieving one of the desired outcomes of the CILASS Programme that states, "Staff and students engage in IBL development, experimentation and innovation" [9].

Accessibility

Another impact that emerged from the study was the access of technology to teaching and learning. Most staff appreciated the idea of having access to technology in the CILASS learning spaces since it made teaching activities easier and giving feedback sooner.

Having technology embedded in the CILASS spaces allowed staff and students to find ways to communicate, collaborate, and interact. Additionally, these tools enable teachers to give instant feedback for students work. Furthermore, these allowed students to seek guidance from teachers inside and even outside the classroom since technology were available for them. Providing students access to technology beyond the four walls of the classroom would encourage extended communication and engagement.

Impact to student's practices

This section will discuss the implications of using the CILASS spaces for student's experiences of learning. Majority of the staff interviewed were enthusiastic to share observed changes to student's characteristics while being taught in technology-rich learning and teaching spaces.

Participatory

As perceived by staff, students have become more participative in these spaces compared to sessions usually held in conventional lecture rooms. They were observed to be more confident to talk to each other and had lesser inhibitions. In fact, students who would less likely talk during discussions have been showing inquisitiveness and asking more questions to their teachers on these spaces. This perhaps can be attributed to the physical characteristics of the learning space that as Graetz [12] points out "can affect learners emotionally, with important cognitive and behavioural consequences" and further concludes:

"In any learning environment, physical characteristics that cause discomfort can be expected to interfere with learning; environments that produce positive emotional states can be expected to facilitate learning..."

Moreover, this result portrayed the habits of the Net Generation, which is experiential and preferred learning by doing (NLII, 2004). Students of today tend to be impatient with the usual lecture-type delivery while being seated for a couple of hours inside a lecture theatre. For them, learning means experimentation. Learning means involvement. Being in learning environment with access to technology makes this possible to happen.

The study found this as a positive impact. However, this poses a challenge for teachers to create teaching pedagogies appropriate for this type of learners. If teaching activities even in these spaces still adhere to the non-participatory ways, there might be a tendency for students to negate on this behaviour.

Independent

Aside from taking part in class activities, students seemed to appreciate the freedom that the space provided. As

one staff said, “having independence made them realize their potentials as students...” (Sf9).

This impact revealed that although students love working in groups, they continue to value their independence of working alone. Learning by themselves and making their own inquiry showed their individuality. This showed good practice as they compete for each other and develop their potentials as students. Giving them freedom to work on their own made them feel that they are valued and respected. Treating them as mature learners in a way deepened their interest to learn. As a consequence, metacognition or self-assessment of ones’ own learning might be considered by staff in the process [4].

Social

In the near future, active and social learning strategies would be the trend on teaching and learning as claimed by Brown and Long (2006). This would involve active learning, interaction, and social engagement between student and teachers.

A finding of this study revealed this trend. Students had become socially engaged in group works, debates, and discussions which staff believed was a positive impact. Having to work in groups allowed more interactivity amongst students in class. Similarly, this seemed to boost confidence since peer support was just within reach.

Moreover, the CILASS spaces have been designed to support formal and informal learning activities. Features that can be used informally include the ‘soft’ spaces, breakout areas, and small-group rooms at the Information Commons. Students who have been interviewed appreciated these informal spaces. According to them, the provision of comfortable soft seating couches gave them a private area to relax and chat with friends.

However, one student suggested to perhaps putting up signs for free utilization of breakout areas particularly the one situated outside the collaboratory 1. Accordingly, the space seemed to be a private area for CILASS staff and this made students hesitant to use it. Perhaps additional signages of CILASS spaces for student’s awareness might be beneficial.

Mobile

Another observation that emerged from the study was describing students to have become mobile. While in this learning space, they seemed to be moving constantly and interact more often. New learning spaces and multi-media technologies allowed this to be possible. In a way, this enhanced accessibility had emphasized mobility, active learning, social engagement, and greater access to resources, which support student learning.

Brown differentiates the traditional paradigm from the constructivist paradigm of teaching and learning [2]. In the constructivist paradigm featuring the Net Generation, roles have changed to become mobile from fixed. Students of today prefer to learn while on the move rather than sitting down on rows of chair facing the lectern. Today, with tools around them – technology and space – students learn through inquiry and discovery of things that arouses their curiosity.

Digital

Aside from changes of student's practices that preferred mobile roles from fixed roles, findings of the research indicated that students had become digital. Again, this showed the characteristics of the 'NetGeners' that seemed to treat technology "as a way of life" [19].

Comments reflected by few staff showed prominent characteristic of students these days – being used to technology - which made them adept on the field. The CILASS spaces, being embedded with learning technologies portrayed support for students in this aspect. However, some staff realised that although technical problems rarely happen, negative impact such as feelings of frustration and impatience were still reflected on student's faces.

As learners and learning environments change, it is important to consider the support available when technology fails to work as expected. Several suggestions were raised on this issue, which includes staff attendance to refresher trainings and workshops on how technology works and availability of an onsite technician as well.

Implications for CILASS and the University

After having explored the impact of the use of CILASS technology-rich spaces to teaching and student's experiences of learning, it was essential to discuss the implications it has for CILASS and the University of Sheffield.

The findings of this study indicated that the technology-rich learning and teaching spaces of CILASS have been exploited by staff and students for academic endeavour. Majority of staff appreciated not only the new learning environments but also the initiative of CILASS on this project. The spaces were met with great enthusiasm and optimism for similar projects university-wide. Most of the staff realized the importance of having the technology embedded in learning spaces of today and were eager to learn innovative ways of teaching using all the tools available in the spaces. In general, the desired outcome of the CILASS programme that guided this study had been a resounding success.

Nevertheless, implications for CILASS learning and teaching spaces and the University were similarly considered, which follows:

1. Providing new learning spaces such as the CILASS project is worth-investing to transform learning and teaching in Higher Education. The University should endeavour to provide more flexible, more adaptive, and more student and tutor-friendly spaces for learning and teaching in the future.

2. As learning environments evolve, it is essential that the University should think about aligning assessment methods of students to new styles of teaching and learning.

3. In spite of the increasing demands for 'high-technology' within these spaces, the importance of providing 'low-technology' back-up such as overhead projectors could be considered. Likewise,

additional technical support personnel should be made available at all times for immediate assistance when problems on technology arise.

Since every department has diverse needs in terms of learning spaces, it is important to identify these needs before the design of such spaces. Consultation meetings with departments for this purpose should be conducted prior to building new learning spaces in order to achieve its pedagogical intention.

4. Conclusion

The study found out several impacts on the use of CILASS spaces by staff experiences of teaching.

1. Staffs had deepened their engagement to teaching and developed approaches to Inquiry-based learning that promotes collaboration, communication, and interaction of students. Specifically, the flexibility of the spaces was a major factor of this impact.

2. Staffs had established a student-teacher relationship that changed their role as facilitator and researcher rather than as a lecturer and made them learn while teaching at the same time.

3. Staffs had appreciated the new learning environment that was more appropriate for adult learners. For them, teaching in such spaces had given a sense of pride, which in return made students feel valued and respected.

4. Staffs had recognised the potential of technology-rich learning and teaching spaces and fostered innovative ways of using the spaces.

5. Staffs had identified the benefits of technology embedded in these spaces that supported teaching and learning. Technological access was considered an essential component in these spaces.

Several impacts and changes to student's practices to learning were discovered in the use of CILASS technology-rich spaces.

1. Students had shown to become more participative in class activities. The spaces had enhanced collaboration, communication, and greater interaction to their peers, thus developed range of skills and helped build self-confidence.

2. Students had appreciated the freedom that the spaces evoke, giving them independence in using technologies to suit individualised learning, thus, help to realise their potentials.

3. Students' experiences of working in groups increased their social skills and had an impact on their ability to learn. The CILASS formal and informal spaces had provided students a well-designed environment for social interaction with co-learners that motivates knowledge-sharing.

4. Students had assumed mobile roles in the use of CILASS spaces. The technology and space enabled them

to exercise an experiential, learning-by-doing approach in their studies and developed their inquiry skills.

5. Students had revealed practices of digital learners when using the technology-rich learning and teaching spaces of CILASS. Having access to technologies had broaden their use of ICT's and enhanced their IT skills in particular.

5. Recommendation

Assessment and evaluation of technology-rich learning and teaching spaces is still a relatively new area of research. Further study on this topical area would be vital and valuable for learning institutions in the future.

Thus, some recommendations might be worth to consider for future research.

1. The current study employed a qualitative approach in evaluating the impact of the use of the spaces. It might be interesting to use a mixed method of qualitative and quantitative approaches in future studies. Aside from exploring staff and student's experiences through interviews, which was the case of the current study, conducting focus group discussions and observations could also be carried out. A quantitative study could reveal statistical relationships between learning spaces and their uses.

2. The current study explored the changes of student's practices in using the CILASS spaces, which was mostly based on staffs observations and experiences in teaching. This was due to the limited number of students to be interviewed when the study was conducted. A future study with a similar topic on impact evaluation could be done, which would focus more on students experiences of using the spaces rather than as observed by staff.

3. The current study had focused on exploring the impact of using the CILASS collaboratories by staff and students of the University. A future study could look at how other Centre of Excellence in Teaching and Learning (CETL) carry out their own impact evaluation of technology-rich spaces. This could involve interviews of key personnel and visits to other CETL sites in the United Kingdom.

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