Canterbury Christ Church University's repository of research outputs

http://create.canterbury.ac.uk

Canterbury
Christ Church
University

An investigation into the impact of Self Organised Learning Environment (SOLE) on student engagement in Higher Education.

Amy Clark

Canterbury Christ Church University

Abstract

Student engagement has become a cause for concern within higher education, and research has begun to identify specific areas within educational practices that are effective surrounding student engagement (Kahn, 2014). Earlier work conducted by Sugata Mitra referred to as 'the hole in the wall' experiments, have shown that groups of children can learn without the assistance of adult intervention. The aim of this paper was to investigate student engagement levels utilising the Self-Organised Learning Environment (SOLE) with adults, in a first year university seminar. The experiment was conducted utilising the SOLEs procedure applicable to a higher education setting. Results, which are discussed in the paper, show that there was a non-significant increase (+11.6%) in student engagement levels utilising SOLEs, compared to traditional seminars students previously participated within.

Keywords: Self Organised Learning Environment, SOLES, Student Engagement in Higher Education.

Introduction

According to Kahn (2014), there has been an increase with regards to concerns surrounding student engagement within higher education. Student engagement in its immediate sense, refers to the contribution of time, commitment and resources that students make towards their learning (Krause and Coates, 2008). More broadly, Trowler (2010, p. 3) suggests that the literature views student engagement as connecting to the 'interaction between the time, effort and other relevant resources

invested by both students and their institutions intended to optimise the student experience and enhance the learning outcomes and development of students and the performance, and reputation of the institution'. There have been clear, established links between student engagement and variables such as student retention (Kuh *et al*., 2008) and academic performance (Pascarella e*t al*., 2010). It has been evident that HE institutions stand to gain a good deal from any engagement of student body that they foster, and research has also began to identify specific areas within educational practices that are effective, in particular those surrounding student engagement (Kahn, 2014).

The self-organised learning environment (SOLE) was developed by Sugata Mitra, and is originally known as 'the hole in the wall' experiment (Mitra, 2003, 2005, 2006). The SOLE's learning environment is characterised by its distinct absence of an adult intervention, also referred to as 'minimally invasive education (MIE), (Mitra *et al*., 2005). The MIE approach involves exposing the learner to an environment where no instruction is given, this has been found to be highly effective with learning (Mitra, 2000).

A SOLEs session in a school classroom, briefly involves a session from around thirty to ninety minutes, the teacher will engage the students with a question that they want to address. The question chosen will be challenging to the students and not one that would be regarded as 'easy', they are also indirectly related to the subject area. Students would get into groups of approximately four, with one computer that has access to the internet. Students are allowed to change groups, talk to each other and walk to other groups. The teacher's role is minimal, observations are only allowed at this stage. Teachers facilitate SOLEs through the challenging questions that are set, but have limited pedagogic input until the final plenary stage. Teachers can have a varying degree of input, sometimes a student can be nominated by others to become the role of a 'supervisor', to manage noise levels and sort out any disputes. The 'supervisor' is the only individual who can interact with the teacher. The groups should produce and present to the class with a one-page report around two thirds of the way through the SOLEs session, where they describe and explain what has been found, the teacher can expand on this later on within another class (Doran *et al*., 2013).

Initial experiments were conducted by Mitra in India between 1999 and 2006, and consisted of a set of computers in a public area that were made available for unsupervised children to use. These experiments demonstrated that children were able to facilitate learning by the use of computers when working in small groups, and their ability to learn was not hindered without the presence of a teacher. In earlier experiments (Mitra and Rana, 2001) groups of children were able to self-instruct themselves to use the internet and computers and subsequently, it has been reported by Inamdar and Mitra (2004) that this can also aid school children with their work, and possibly provide an impact on their social values. SOLEs sessions have also been found to provide a space for spontaneous creativity and unexpected learning, due to their possibly not being any predefined learning objectives (Dolan *et al.*, 2013). Other positive aspects of SOLE applicable to HE include the students having more responsibility for their actions when forced with uncertainty (in this case, the complex question given within the SOLE session), the students also shape their own engagement as they are more in control of their learning due to the MIE, and the students engage in reflexive approaches to their learning (Archer, 2003), which all of these are seen to enhance and contribute towards their 'graduate attributes'.

Mitra's research usually tests students before and after they have participated within a SOLE situation. The tests are usually orientated towards topics that are suitably curriculum or module related, but contain a higher standard of questioning / level, than what the students are used to (Mitra, 2012). However, detailed critical evidence surrounding this is still yet to be published. On the other hand, quantitative evidence from a range of contexts implies that students tend to answer more challenging questions, and retain the information for a longer period of time by participating within a SOLE session (Mitra and Rana, 2001; Mitra *et al.*, 2003; Mitra and Dangwal, 2010; Mitra, 2012; Mitra and Quiroga, 2012).

SOLEs falls into the Action Research paradigm of educational research, as Blinde (1995) suggests, incorporating active learning within the higher education module of sociology of sport, has many positive outcomes, including an increase in inquisitiveness, and a development to foster critical thinking skills (Bennice 1989; Taub, 1991; Van Eynde and Spencer, 1988). It is relevant to note at this point, that the The QAA, (2008) suggests that sport is a substantial area, with differing content across sector. By incorporating the SOLES approach into higher education and the Sociology

of Sport module, this offered a new, interesting, and insightful way to develop the student's potential and knowledge of the specific discipline, and create a new way for them to ascertain higher engagement levels, which can be seen adhering the following QAA quote:

> 'Sport has emerged as one of the largest areas of academic interest across the UK, with a broad-based body of knowledge and an increasing interest in the development of new knowledge. Sport and related subjects are now well-established as credible academic areas of study and research within UK HE. This is characterised by not only a range of discipline-specific programmes of study and research, but an increasingly apparent multidisciplinary and/or interdisciplinary approach covering conceptual and contextual frameworks.' (QAA, 2008, p12).

There have been many blogs and forums where teachers have discussed the positive results from utilising SOLEs within their teaching, but little studies have shown SOLEs impacts on student learning and engagement within a higher education setting (Doran *et al.*, 2013) Thus, there is a need now, and gap for research and evidence about the mechanisms by which SOLE is used to enhance engagement levels for students at University.

This study contributes towards the wider literature and debates surrounding the utilisation of the SOLE. This paper draws upon data obtained within a pilot study at Canterbury Christ Church University in 2015. The reasoning for conducting a pilot study was to analyse the effectiveness of SOLE on student engagement, and to see whether it would be worth further analysing and researching. The purpose of the analysis of student data was not to evaluate the SOLEs as such, but to provide an insight into the engagement levels and views of the university students who participated. The reason for this, was to gain a further understanding with regards to how students utilise their time, commitment and resources towards their engagement levels (Kahn, 2014) within a SOLE session, in comparison to the more traditional seminars they are used to, and for this to add to the small but growing body of literature surrounding student engagement and the SOLE.

It is evident through the literature that the utilisation of the SOLE in schools and different cultures is successful, students are able to monitor their time, commitment

and resources, and issues surrounding the sustainment of their engagement (Khan, 2014). However I wanted to specifically ask the students how engaged they felt and what they particularly liked about the session. The following pilot study applies the original procedures of SOLE, but to new people (adult students), in a new situation (university seminar environment) and in a new culture (based in the UK), with a new aim and output towards the growing body of literature. It is hoped that students will feel more engaged when participating within the SOLEs session in comparison to the previous seminars.

Research question

Taking into consideration the literature surrounding SOLES, the following research question was therefore the main focus of this study:

- What is the impact of Self Organised Learning Environment (SOLE) on student engagement with a HE context?

Methodology

Historically, I would walk around my seminars questioning my student's knowledge, and would also question them with regards to the reading that had been set for them to complete for the seminar. Students would gather themselves into small groups and would be given a task. Webb (1989) and Lehman (1997) suggests that experiences of group work directly effects student learning and achievement. On the other hand, Scott-Ladd and Chan (2008) suggest that some researchers question whether teamwork is beneficial in educational outcomes due to problems that may arise. Many students would not complete the suggested reading, which became frustrating as they hadn't learnt anything prior to participating within the seminar, therefore extra time was needed for them to complete the reading, or the discussion which followed would become stagnant very quickly. I therefore, wanted to change the nature of their higher education experience by facilitating a SOLE session.

Participants*:* Overall, sixty female and male students participated within the study, they were all first year students on the Introduction to Sport, Culture and Society module at Canterbury Christ Church University. Following ethical approval by Canterbury Christ Church University Ethics Committee, the students were given the opportunity to verbally agree to consent within the SOLES study after the nature of this research had been fully explained to them. It was also explicitly stated that their overall grade for this module would not be affected if they chose not to participate within this study.

Throughout the duration of my research, I journeyed through three main SOLE phases (figure 1). I have produced this diagram for an easier understanding and adherence to the SOLE procedures.

Figure 1. The three phases used for SOLE research.
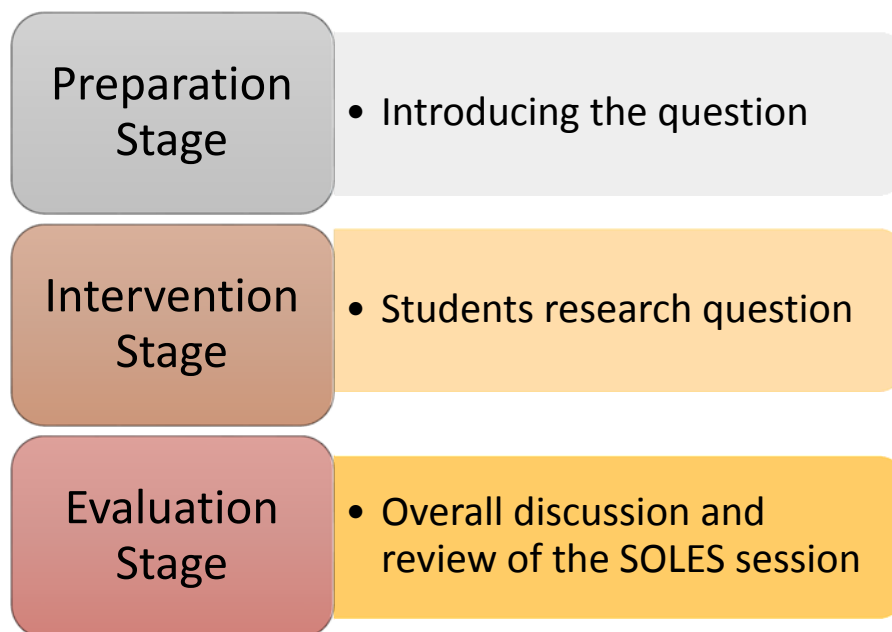
Procedure: The study was conducted a few weeks into the module, this was to ensure that the students had experienced, and were familiar with the more traditional seminars that are normally taught within the module. I adhered to the procedures that were utilised by Mitra (2004) and Dolan *et* al (2013) as these studies were shown to

be highly effective when conducted. Although due to the nature of more mature students participating, a 'supervisor' within the group was not necessary. A qualitative approach was conducted with the use of questionnaires, the students received the first questionnaire (see appendix) before, at the start of the seminar, and they received the second questionnaire (see appendix), after the seminar, once SOLE had been applied to assess their engagement levels. Prior to the study being conducted, a brief description of the SOLE was demonstrated, and students were able to verbally agree to participate. The students formed groups of around four, they were able to choose their own groups, and move around between the other groups at any time to gather information that they could take back to their original group.

The students were given one complex question to answer, *'Race as a biological concept is a fallacy. However, belief in biological 'race' is dominant' (McDonald 2013, p. 195) - Can you give examples from sport, leisure and PE that supports the statement above?'* They were only allowed to answer with the use of one electronic device with access to e-library and other reliable academic external sources they could use for research. I initially contacted the module lead and explained the nature of my research, therefore the question given was not chosen by myself.

The students were given twenty minutes to research the question, and were told at the end that they should be ready to present their answers back to the rest of the class with their findings. As the class lead, in accordance with the SOLE design, minimally invasive education (MIE) was conducted. I was only able to provide encouragement, but no direction. After the twenty minutes of research, each student presented their answers back to the rest of the class.

After the SOLE session, and the second questionnaire was completed, a plenary was conducted. I informed the students with the correct guidance and information and suggested that overall they had successfully answered the question. (Dolan *et al.*, 2013). The students were also having a lecture surrounding 'Race & Ethnicity' the following week to address and support any ideas or issues which may have arose during the SOLE session.

Data Analysis: Quantitative data retrieved in this study, was analysed with SPSS version 21. The data was assessed for normality using a Kolomogorov-Smirnov test, and this confirmed that the data was not normally distributed. A Wilcoxon's test was therefore conducted to assess the difference between groups (pre and post SOLES session), the statistical significance level was set at $p<0.05$. Qualitative data retrieved in the second questionnaire was gathered and split into emergent themes.

Results

The data is reported for 60 first year students, and was collected via questionnaires (see appendix). They were distributed pre and post the Self Organised Learning Environment. There was statistically, a non-significant increase (+11.6%) in the SOLES session (mean = 1.2167) compared to student engagement in previous seminars (mean = 1.1167, $p = .509$).

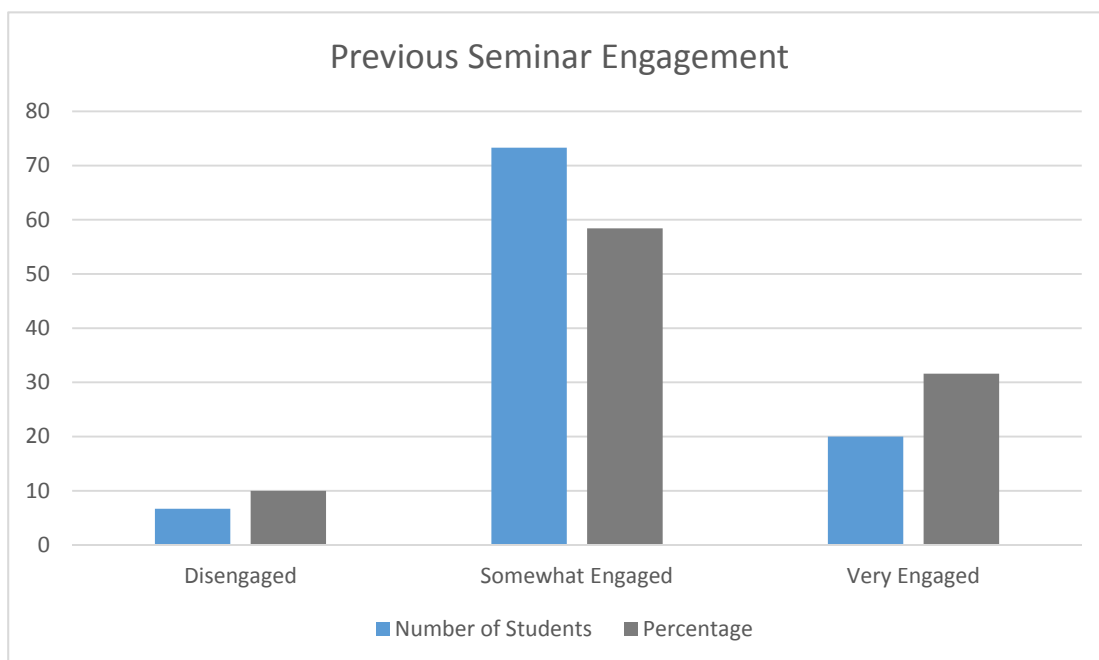**Figure 2.** Previous seminar engagement.

Figure 2 displays the students' engagement levels through the total number of students who were disengaged, somewhat engaged, and very engaged, and the percentage of each student engagement level overall, within previous non-student organised learning environment seminars they have participated in. Disengaged (n=4, 6.7%), somewhat engaged (n=44, 73.3%), and very engaged (n=12, 20%).

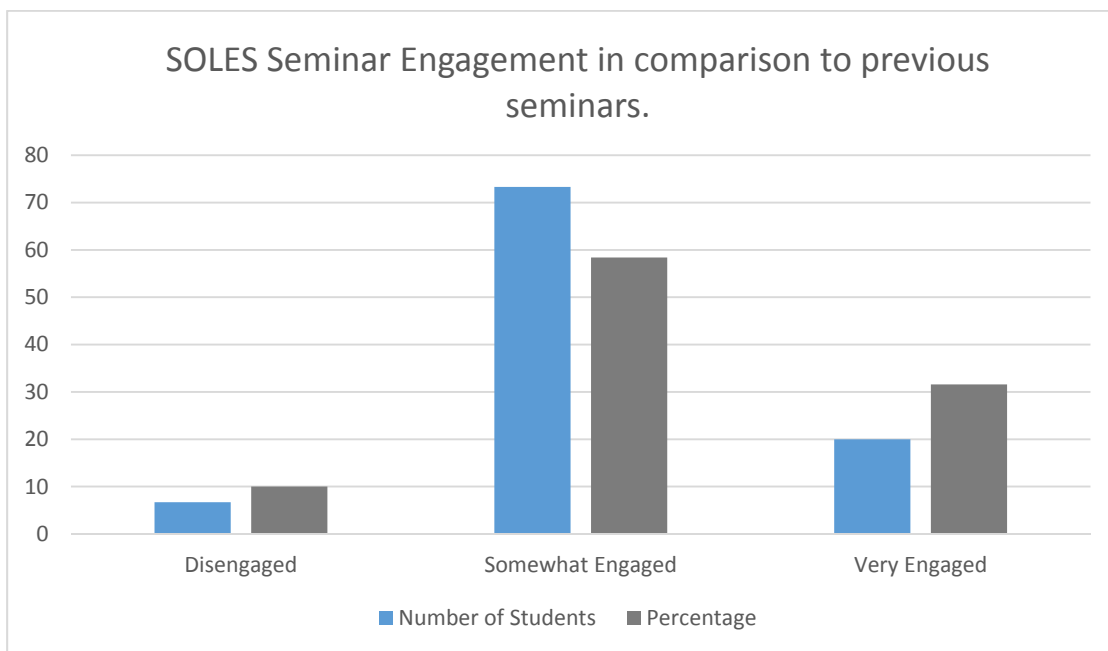**Figure 3.** SOLES Seminar Engagement in comparison to previous seminars.

Figure three displays the student's engagement levels through the total number of students who were disengaged, somewhat engaged, and very engaged, and the percentage of each student engagement level overall within a student organised learning environment. Disengaged (n=6, 10%), somewhat engaged (n=35, 58.4%), and very engaged (n=19, 31, 6%).

Table 1. Percentage difference between previous seminars and SOLES seminar.

Engagement Level	Previous Seminar percentage	SOLES Percentage	Difference in percentage
Disengaged	6.7%	10%	+3.3%
Somewhat engaged	73.3%	58.4%	-14.9%
Very engaged	20%	31.6%	+11.6%

Table one displays the percentage difference between previous seminars and the SOLE seminar the students have participated within. An 11.6% increase in student engagement levels was seen within the SOLE session compared to previous seminars, although this was non-significant, it suggests somewhat that students feel more engaged and are able to differentiate between their time, commitment and resources (Kahn, 2014), and also optimise their student experience and enhance their learning outcomes and performance (Trowler, 2010) in order to feel 'very' engaged within a SOLEs session in comparison to a traditional seminar. This is also supported by the qualitative data obtained, as many students suggested that they felt more engaged and motivated within the SOLE session.

Discussion

The purpose of this study was to investigate the impact of SOLEs on student engagement in a higher education context. Given the findings from this pilot study, and in relation to the research question 'What is the impact of Self Organised Learning Environment (SOLE) on student engagement with a HE context', it becomes evident that student engagement increases (+11.6%) dramatically when they participate within a SOLEs session compared to traditional seminars, interestingly this was non-

significant when analysed. This means that SOLE creates a powerful environment for student engagement and accords to, and engenders the definition of engagement as previously stated by Kahn (2014) and Trowler (2010). There is compelling evidence to suggest that SOLE has inspired educators across the globe, due to its perception of being innovative and exciting through its early results (Mitra, 2006; Doran *et al.*, 2013). Through high engagement levels, this also shows that positive results from utilising SOLE could also enhance student retention and academic performance within higher education (Kuh *et al.*, 2008; Pascarella, *et al.*, 2010).

This investigation clarifies that a SOLE session should be included as an important part of student learning through the Sociology of Sport module. It crosses boundaries and approaches to learning through alternative strategies, and enhances pedagogic practice within a higher education, it also favourably agrees with the studies conducted by Sugata Mitra. It also supports Webb (1989) and Lehman (1997) suggesting that group work is an important part of student learning and experience. It also argues against Scott-Ladd and Chan (2008) who suggest that group work can become problematic, as during the SOLE session students were able to pick their own groups, and no problems were reported throughout the duration of this study.

Of course, SOLE isn't without its critics. Clark (2013) suggested that SOLEs lacks novelty, and that there is nothing new in the organisation of a lesson to involve groups of students who explore answers to challenging questions that are set by teachers. This can be supported by the qualitative data collected within the current study, those who were 'disengaged' (+3.3%) within the SOLEs session explained that they preferred to have a discussion with a teacher during the intervention stage (figure 1) to help with the direction of their thoughts, and to reinforce their understanding. Alternatively, those who were 'very engaged' suggested that the 'lack of input' or 'MIE' challenged their knowledge more, and helped to keep their concentration a lot more.

Due to this current investigation only being a pilot study, future research would be suggested to conduct the same SOLE session across a longer duration of time to evaluate its effectiveness across an entire module, this could raise concerns surrounding MIE, due to the SOLE research flourishing from a Western Culture and applicable normally to young children in third world countries, the nature of this research needs to address and embrace the same positive procedures and outcomes,

but within a HE context. Although this could be seen as troublesome in HE, due to students within this culture paying for their tuition fee, it this can be seen through the qualitative data that students want to have a lecturer input within a session purely because they are responsible for their tuition fees. One individual in the study stated 'I pay £9000 a year and want a lecturer helping out during my research, not minimally inputting'. By carefully entwining and adjusting modules to include a variety of techniques such as the SOLE, could be a welcome addition without the forefront of concerns over tuition fees.

Research within the UK on the utilisation of SOLEs applied to a higher education setting is scarce, therefore, further research applied to this area would be most enriching. Sixty university students participated within this number, it could be argued that due to SOLE being applied to a small sample group, the results could dramatically differ if a larger group was investigated. It could be suggested that within this study, an element of bias is present. With the use of questionnaires in this study, 'response biases' may have occurred, this is can be induced or caused by a number of factors, which are all related to the thought that human subjects do not respond calmly to stimulation, rather, they actively incorporate multiple sources of information to generate a response in a specific situation. Although given this, it has been seen that questionnaires still often have high reliability (Gove and Geerkan, 1977). Within the qualitative data retrieved 'citation biases' may have occurred, where the researcher specifically disseminates only the positive data retrieved, and only reveals the positive outcomes (Pannucci and Wilkins, 2010). I have tried to eliminate this by exposing and consequently discussing positive and negative results disseminated within the study. Future investigations could also specifically delve into the reasons and implications behind the 'disengaged' and 'somewhat engaged' percentages also found within this study.

This study investigated into student engagement levels participating within a SOLE session, however, although this has never been researched before to my knowledge, further qualitative data could be obtained to enlighten and support in depth, exactly why students where either very engaged, somewhat engaged or disengaged within a SOLE session, as Fredricks *et al*,. (2004) suggests a richer view of how 'students

behave, feel, and think' in understanding the notion of engagement, needs to be investigated further.

Conclusion

This pilot study overall concludes that the utilisation of a Self-Organised Learning Environment in a university seminar setting, non-significantly increases student engagement by 11.6%, compared to previous traditional seminars settings participated in. Finally, this study urges the need for further awareness on the use of SOLEs within a higher education environment surrounding its effectiveness on higher education student engagement.

Reference List

Archer, M. S. (2003) Structure*, agency and the internal conversation* (Cambridge, Cambridge University Press).

Bennice, D.A. (1989) 'Active Learning: An approach for better student/teacher relationships', *Education*, 109, p. 494-496.

Blinde, E.M. (1995) 'Teaching sociology of sport: An active learning approach', *Teaching Sociology*, 23 (3), p. 264-268.

Clark, D. (2013) *'More holes in Mitra's 'hole in the wall' project'*. Blog: Donald Clark Plan B. Accessed 2/2/2016 from: http://donaldclarkplanb.blogspot.co.uk/2013/06/more-holes-in-sugata-mitras-hole-in.html

Dolan, P., Leat, D., Mazzoli Smith, L., Mitra, S., Todd, L., and Wall, K. (2013) 'Self-Organised Learning Environments (SOLES) in an English School: an example of transformative pedagogy', *The online education research journal*, p. 1-19.

Fredricks, J. A., Blumenfeld, P. C. & Paris, A. H. (2004) 'School engagement: Potential of the concept, state of the evidence', *Review of Educational Research*, 74 (1), p. 59–109.

Gove, W. R., and Geerken, M.R. (1977) 'Response bias in surveys of mental health: and empirical investigation', *American journal of Sociology, 82*, p.1289-1317.

Inamdar, P. (2004) 'Computer skills development by children using 'hole in the wall' facilties in rural India', *Australasian Journal of Educational Technology*, 20 (3), p. 337-350.

Khan, P.E. (2014) 'Theorising student engagement in higher education', *British Educational Research Journal*, 40 (6), p.1005–1018.

Krause, K. L. & Coates, H. (2008) 'Students' engagement in first-year university', *Assessment and Evaluation in Higher Education*, 33 (5), p. 493–505.

Kuh, G. D., Cruce, T. M., Shoup, R., Kinzie, J. & Gonyea, R. M. (2008) 'Unmasking the effects of student engagement on first-year college grades and persistence', *The Journal of Higher Education*, 79 (5), p.540–563.

Lehman, P. (1997) 'Group problem-solving approach to learning about gender stratification and research process in introductory sociology', *Teaching Sociology*, 25 (1), p. 72-77.

McDonald, B. (2013) 'The reproduction of biological 'race' through physical education textbooks and curriculum', *European Educational Review*, p.1-16.

Mitra, S. (2000) 'Minimally invasive education for mass computer literacy', *CRIDALA Conference*. Hong Kong.

Mitra, S. (2003) 'Minimally invasive education: a progress report on the "hole-in-the-wall" experiments', *British Journal of Education Technology*, 34 (3), p. 367-371.

Mitra, S. (2004) The Hole in The Wall, *Dataquest (India), Sept 23 Issue.*

Mitra, S. (2005) 'Self organising systems for mass computer literacy: Findings from the 'hole in the wall' experiments', *International Journal of Development Issues*, 4 (1), p. 71-81.

Mitra, S. (2006) *The hole in the wall: Self-organising systems in education*. New Delhi and New York: Tata-McGraw-Hill.

Mitra, S. (2012) *Beyond the hole in the wall: Discover the power of self-organised learning.* TED Books.

Mitra, S., and Dangwal, R. (2010) 'Limits to self-organising systems of learninig – the Kalikuppam experiment', *British Journal of Education Technology*, 41(5), p. 672-688.

Mitra, S., and Quiroga, M. (2012) 'Children and the internet – A preliminary study in Uruguay', *International Journal of Humanities and Social Sciences*, 2 (15), p. 123-129.

Mitra, S., and Rana. V. (2001) 'Children and the internet: experiments with minimally invasive education in India', *The British Journal of Education Technology*, 32 (2), p. 221-232.

Mitra, S., Dangwal, R., Chatterjee, S., Jha, S. Bisht, R.S., and Kapur, P. (2005) 'Acquisition of computing literacy shared public computers: Children and the 'hole in the wall'', *Australasian Journal of Educational Technology*, 21 (3), p. 407-426.

Mitra, S., Tooley, J.N., Inamdar, P., and Dixon, P. (2003) 'Improving English pronunciation: an automated instructional approach', *Information Technologies and International Development*, 1 (1), p. 75-84.

Pannucci, C.J., and Wilkins, E.G. (2010) 'Identifying and avoiding bias in research', *Plastic and reconstructive surgery*, 126 (2), p. 619-625.

Pascarella, E. T., Seifert, T. A. & Blaich, C. (2010) 'How effective are the NSSE benchmarks in predicting important educational outcomes?', *Change: The Magazine of Higher Learning*, 42 (1), p.16–22.
Scott-Ladd, B., and Chan, C.C.A. (2008) 'Using action research to teach students to manage team learning and improve teamwork satisfaction', *Active Learning in Higher Education*, 9, p. 231-248.

Taub, D.E. (1991) Strengthening the social within social psychology: An experiential learning approach', *Teaching Sociology*, 19, p. 186-192.

The Quality Assurance Agency for Higher Education (2008) Hospitality, sport, leisure and tourism.

Trowler, V. (2010) Student engagement literature review (York, Higher Education Academy).
Van Eyende, D.F., and Spencer, R.W. (1988) 'Lecture versus experiential learning: Their differential effects on long-term memory', *The Organisational Behaviour Teaching Review*, 12, p. 52-58.

Webb, N.M. (1989) 'Peer interaction and learning in small groups', *International Journal of Educational research*, 13 (1), p. 21-39.

Appendices

Questionnaire one:

How engaged do you find yourself in previous seminars on this module? (Please circle only ONE answer)

Disengaged

Somewhat engaged

Very engaged

Questionnaire two:

How engaging did you find today's seminar in comparison to previous seminars? (Please circle only ONE answer)

Disengaged

Somewhat engaged

Very engaged

Do you prefer todays SOLES approach to your other seminars?

Yes

No

Please explain further: _____

_____

_____

_____