Using a constructivist approach to develop self-learning materials and promote learner engagement for out-of-school children in Sri Lanka

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ABSTRACT

Addressing the issue of access to quality education is a matter of urgency, and yet the formal education system has not tended to provide education for all. For out-of-school children, therefore, distance and open learning methodologies have been adopted by developing countries as an alternative path to address their educational needs. The challenge is how to bring them back to the learning process again and how to motivate and engage them for active learning.

The purpose of this study was to investigate how constructivist approach and principles support for the development of self-learning materials that promote learner engagement and motivation of out-of-school children. The traditional design process is based on objectivist learning theories and it promotes passive learning rather than active learning. Particularly, in the out-of-school context the learners may drop out from their formal schooling for a lengthy period and they may not have had an interesting experience regarding their formal schooling that can be motivated to restart their learning. Accordingly the key challenge is to orient out-of-school children for self-directed learning. In this sense, the constructivist design principles support learner-centred learning and self-regulate learning. In other words, the constructivist design principles are more compatible with open and distance learning.

Ten course writers and ten out-of-school children were selected through purposive sampling as participant and target group of this study. By conducting training program made the course writers aware of constructivist approach and assisted them to develop skills of writing learning activities embedded constructivist design principles. At the end of the training program the course writers tested the sample materials developed with a targeted group of out-of-school children. The data were collected using interview, reflective journal, evaluation report, informal discussion, guideline and documents and results were presented as individual stories of the children.

The overall findings have provided conclusive evidence that constructivist approach and design principles do support the creation of active, constructive and meaningful learning and learner-motivated learning materials. The findings indicate that this type of material was practical and meaningful and students were excited when they were learning what they deemed relevant. The materials were able to engage the students in a continuing learning process and they were successful in integrating the whole environment into students’ learning, successfully providing multiple avenues and multiple resources for students’ learning processes. The study concludes with a recommendation for a paradigm shift in educating out-of-school children - a shift from traditional instructional design methods to a constructivist approach.

Key words: out-of-school children, constructivist approach, design self-learning material, active learning.
Introduction
From among the countries in the South Asia Region Sri Lanka enjoys a high (96%) literacy. Nevertheless, one very serious problem that Sri Lanka faces today is that out of the appropriately four millions students entering school, a remarkably large percentage drops out without completing their formal education. Nationally, dropout rates in primary education are very low at 0.7% and 0.5% for males and females respectively. They increase at secondary level to 7.1% and 4.6% for males and females in Grades 6-10 respectively (MOE, 2008). However, there is visible disparity of participation. The rate for country primary enrolment was 96% (2010) but 89% for poor, at the junior secondary level compared 96% for rich. At the upper secondary level for poor it was71% (DCS, 2009/2010).The Child Activity Survey in 2008/2009 showed that of children who do not attend school, 19.1% were engaged in child labour: 20.8% were aged 12–14 years and 1.1% was aged 5–11 years(DCS, 2008/2009).

The government has implemented a number of actions to promote children’s attendance at schools and to keep them in the school system. However, it has not really considered providing education access to the children who drop out from schools at an early age before completion of their compulsory education. The issue is how to provide access to education for these children. Their learning should be meaningful for their real life. The learning should be flexible, providing opportunity for the out-of-school children to learn whatever they prefer to learn whenever they like to learn and at their own pace. Unlike those in school these out-of-school children may not like to sit in the same place in a long period because most of the out-of-school children engage in some kind of activities to earn money. In this sense, there should be an alternative path to provide education access for out-of-school children.

Many developing countries have identified distance and open learning as the appropriate and alternative path to provide education access for out-of-school children (NIE,2009, Rumble & Koul, 2007; Perraton, 2001; National Open School (NOS), 2000; Dodds,1996;) In the developing world, printed, self-learning materials is still the prominent delivery mode for open and distance learning. The Commonwealth of Learning (COL) stated that the key challenge of open and distance education is writing self-learning materials that engage and motivate learners to learn (COL, 2001). This paper discusses how constructivist theory and principles support designing self-learning materials to promote learner engagement and motivation out-of-school children.

Research questions
The aim of this study was to investigate how constructivist approach and principles support for the development of self-learning materials that promote learner engagement and motivation of out-of-school children. To achieve this aim the study focused on the following research questions.

1. How can constructivist approach support to the design of self-learning materials?
2. What design principles promote learner motivation and engagement?

Review of the literature
According to many authors’ views (Jonassen, Cernusca, & Ionas, 2007, Staits & Wilke, 2007, Driscoll, 2005, Brown, 1997, Bednar et al., 1995, Honebein, Duffy,and Fishman, 1993, Brooks & Brooks, 1993) the key practices from constructivist learning theory are learning is construction of knowledge according to learner experience, social and cultural context support for construction of knowledge, learning is mentally active process, collaborative supports for learning, learning is related to learner context, learner is central to the learning process, learning is making sense (meaningful), multiple realities and multiple truths, learning is problem based and activity oriented and learning is adaptive. A selection of literature is reviewed how above key practices support for developing self-learning materials.

Constructivist approach to designing self-learning materials
The promotion of engagement for open and distance learners

Many researchers view that constructivist principles are compatible with and help to engage learners in distance and open learning. According to Siemens (2008) that distance learners become autonomous and seek information on their own, they come to understand the existence of an endless world of knowledge. Further, Tam (2000) states that distance learning provides a unique context in which to infuse constructivist principles where learners are expected to function as self-motivated, self-directed, interactive, and collaborative participants in their learning experiences by virtue of their physical location. The autonomy called for by open and distance-learning advocates is also reflected in the constructivist views to encourage active, collaborative and responsible learners.

Motivation, especially in distance educational experiences, provides the fuel for student engagement. Without motivation, students will not use what they know or think about nor will they organise their knowledge. Self-efficacy and the intrinsic value of an academic task have been shown to be positively correlated to cognitive engagement and performance (Pintrich & De Groot 1990). Hence, the constructivist approach is compatible with and helps to engage learners in distance and open learning.

The promotion of active and constructive learning

According to Gazi (2009), the constructivist approach encourages students to manage their learning through “meta-cognitive, self-reflective and collaborative process. A constructivist based learning environment can be successful in effecting salient constructivist attributes such as problem solving and critical thinking skills, creativity, presentation and reflection skills, resulting in enhanced knowledge construction and increased motivation levels Mai Neo, Tse-Kian Neo and Gillian Tan Xiao-Lian (2007). Maxwell (1995) states that in the constructivist view of learning, individuals bring different background knowledge, experience, and interests to the learning situation they make unique connections in building their knowledge. Constructivist learning is adaptive. It is a process of building functional understandings rather than of uncovering fixed truths. Constructivist learning is an active process controlled by the learner so that learning and the context of learning are deeply intertwined (Brooks & Brooks, 1993; Duit, 1995; Duffy & Cunningham, 1996). Further, Perkins (1992) states that students need to develop their own learning strategies, goals and objectives and they should be given responsibility for their own learning.

The promotion of collaborative support for construction of knowledge

Constructivist learning is considered as a student centred instructional model whereby students determine their own learning needs, set their own goals, monitor their own progress and determine how to reach the desired learning outcomes in a collaborative learning environment (Yildirim, 2005). The collaborative activities with others allow them to develop multiple perspectives, where some type of "shared reality” is produced (Jonassen, 2000). Savery and Duffy (1996), Vygotsky’s (1978) also support the concept of interactive learning. Knowledge can be produced when a community of learners interacts with each other. Moore (1990) suggests that transactional distance can be decreased by increasing the transactional dialogue. Within the constructivist approach, learning takes place in collaboration with others. Distance learners need to be more interactive to enhance their learning, maintain and continue the learning, and minimise their isolation. According to this perspective, learning can be, and should be accomplished in cooperative groups.

The creation of an authentic learning environment (situated learning)

According to Driscoll (2007), constructivists argue strongly that knowledge can be constructed without any correspondence to external reality to be meaningful. Learning should be embedded in authentic contexts. By designing an authentic learning environment where students had an active interest in the outcome of the task at hand, they were more apt to pay attention to the information presented, and in doing so, enhanced their understanding of multimedia as well as their topic, making them more likely to become lifelong learners (Mai Neo, Tse-Kian, Neo and Gillian Tan Xiao-Lian (2007) Authentic learning
environments provide children with rich experiences and opportunities to construct knowledge in context, and in ways that make sense to their existing knowledge, which is based on prior experiences (Cox-Petersen & Olson, 2000). Reeves (1997) emphasises the importance of contextual learning in order for students to make connections between the problem and the solution. The constructivist suggests that situated learning is a strategy for learning and promotes transfer of knowledge in day-to-day real-life situations. Courtney and Maben-Crouch (1996) demonstrated that a natural learning environment engages learners in solving authentic, non-routine problems likely to be encountered back on the job. Mandl and Reinmann (1995) also argue that situated learning environments refer to learning as an active, constructive, situated process in which the student learns by discovery, in a flexible way. As with adult learners the out-of-school children might need to utilize their experience in order to learn effectively. Thus, situated learning may be suitable for designing learning experience for out-of-school children.

The development of problem-based learning (PBL)
According to Eurasian J. (2009) problem based learning promotes empowerment and self-reliance and significantly elevates the self-confidence of the learner which cannot be obtainable by using conventional method. Giebler (2000) suggests that children should be exposed to the constructivist-learning environment which encourages open challenges and is flexible and dynamic. In this manner, students are encouraged to become higher-order thinkers and problem solvers. If we want to design learning environments to engage learners in personal and/or collaborative knowledge construction and problem-solving outcomes, then we must consider designing constructivist-learning environments (Jonassen, 1999). Problem-based learning promotes critical thinking and self-monitoring of the learning in the constructivist model (Savery & Duffy, 1996). The major issue in designing learning materials is how to promote intrinsic motivation. The problems are related to the learner context (learner needs, interests) and their real life, which motivates learners to engage in an active learning process to solve problems. In this way, the problem belongs to the learner and it meets the learner’s needs and so it is enhancing the intrinsic motivation of the learner (Norman and Spohrer, 1995).

The above literature review demonstrated that the constructivist approach could be utilised in open and distance learning to create an effective learning process, which is active, creative, motivating, constructive and meaningful.

Methodology
The research was conducted in a natural setting utilizing a case study method. Ten course writers who were engaged in writing self-learning materials for Distance Teacher Education Courses implemented by the National Institute of Education in Sri Lanka were selected as participants for this study. This study investigated the appropriate instructional design principles for writing self-learning materials with particular reference to out-of-school children in the secondary school level age group 11-16 in Sri Lanka. As a target group, 10 out of school children were selected through purposive sampling.

Data collection methods and procedures
In this study, the data were collected utilising multiple data-gathering techniques. Interview, reflective journal, evaluation report, informal discussion and guideline and documents were used. By engaging the course writers in the awareness and practical writing workshops sample learning materials were developed embodying constructivist design principles to identify the practicability of the instructional design principles and constructivist approach for writing self-learning materials. Each course writer was asked to apply the developed sample materials for an out-of-school child and to write a report about how the course writer engaged the child in the learning activity and how was the learning process of the student. They also wrote journal about the practicability of the material and their reflections. The researcher provided the guideline questions for writing evaluation report. At the end of the sample study, the researcher held interview with each course writers relevant on his/her experience and how he/she
evaluated the achievement of learning. In the study, results were presented as individual stories of the children.

**Discussion and findings**

To answer the research questions the data discussion is organised the following themes and each themes relates to the experiences of the out-of-school children.

**Learning related to the learner context**

Constructivist learning is an adaptive, active learning process controlled by the learner and a process of building understanding so that learning and the context for learning are deeply intertwined. According to the Constructivist learning approach, relationship of the learning and learner context is the key point to motivate and engage learners in an active and constructive learning process (Driscoll, 2007; Duffy & Cunningham, 1996; Brooks & Brooks, 1993;)

This study demonstrates that the content of the learning materials (Opening a savings account, Be aware of lightning, Prepare Vesak Lanterns and Fatal Dengue Fever) was related to their needs, experience and environment. Therefore, most students were motivated to do the learning activities. Significantly, the findings show that all four working children who were among the ten out-of-school group selected the topic ‘Opening a Savings Account’ for their learning activity in order to fulfil their need for saving money. Some students demonstrated an active engagement in finding resources for their learning because the content was related to their environment and needs. The study shows that students’ prior experiences assisted students in their learning. Some students had experience concerning what was happening in and around their environment (different programs on dengue fever; posters, and notices, radio and television news regarding lightning disasters). Therefore, they were able to relate their learning easily to their own lives. Accordingly, the study shows that when learning was related to the students’ experience the learners were able to orient more easily to their learning and this motivated students to engage in their own learning processes.

**Real world problem-based learning activities (authentic learning)**

The out-of-school children were a disadvantaged and underprivileged group. Their experience was limited. However, the findings indicate that by providing actual learning situations (situated learning) many students could learn more effectively unless they did not have enough prior experience about their learning situation. In the real-life situations most of the students gained experiences through their own strategies (observation, inquiry and dialogue). The study also reveals that after experiencing real-life situations, most students could be engaged in tasks that promoted higher- order thinking. For example, students used charts, posters, and drawings to reflect what they learned and how they learned. They analysed and summarised the learning. The study demonstrates that where course writers only guide, monitor, and give feedback and scaffolding to support learning problem-based activities promote situated learning and helped to engage learners in an active and constructive learning process.

Many out-of-school programs continue to employ learning processes which are still teacher-oriented and teacher-directed (Shrestha, 1997; Rath, 2000; Nirmala, 2000). This study confirms, previous research by Jain (2001) and Mahapatar (2001) that out-of-school materials must provide balanced opportunities to increase the learner’s participation in real world, learner-centred activities.

**Learner ownership and responsibility**

The study provides evidence that real-world problem-based activities can help learners engage in learning because such activities allow learners to take ownership and responsibility for their learning. The learners here were independent problem-solvers and decision-makers. Another significant finding of this study is that real-life problem-based learning activities have power to motivate and engage students who had previously dropped out from formal schooling in an active
and constructive learning process because the learners could take ownership and responsibility for their learning and learn independently. None of these students wanted to go back to school but they wanted to learn. None of them could recall prior interesting experiences of formal learning and some did not have positive attitudes towards their teachers or their teaching. As Ruwan demonstrates:

I got whatever I needed in the classroom we could not take decisions. In this method, we could make decisions. Where to go? To whom to consult? I was not afraid of anything, as I am not going to school. They did not pay much attention to what I asked” However he said he inquired repeatedly


**Construction of knowledge rather than transmission**

The study demonstrates how learning materials could be created to assist students’ construction of their own knowledge. For example, the learning material “Opening a Savings Account’ was developed based on an actual situation related to the post office. The students had an opportunity to learn by doing. Through inquiry, observation, discussion, filling the necessary forms and dialogues, the majority of the students understood and developed knowledge and skills relevant to opening the account and withdrawing cash.

The study also provides evidence that it is equally important to follow-up the practical activity with a guided task. After opening their accounts, the students were asked to prepare a chart and or to “teach” a friend, to explain the procedure of opening an account. This activity promoted thinking and reflection about what they learned. While they were analysing, summarising, and creating new ideas, they prepared artifacts such as a chart or poster. These activities indicate that the students’ learning was not mere rote or memorising, and was not transmitted by the instructor (course writer). The students constructed their own learning, which could be transferred to other real-world situated-learning activities. These findings are similarly significant, to those of Sharma (2001).

**Self-Directed skills**

The study indicates that in the course writers’ training activities, the learning materials were developed based on students’ real-world problems that were not fully structured or defined. Therefore many students could set their own learning goals and gain ownership and responsibility of their learning. The students could engage themselves by developing their own learning strategies. The important point is that the same learning material was used by many students for their learning yet their learning processes and their learning strategies were different from each other. The study demonstrates that inquiry includes discussion, conversation, explaining, describing, analysing, and interpreting, which were the major learning strategies used by these students. Here, nobody directed most students to develop specific learning strategies. The students worked alone. The significant example is Nadi’s learning story.

Nadi learned alone. She learnt the facts she wanted to. When she could not get the information from her father, she got it from her cousin. She found her old science book and got the information. I did not help her. I only made inquiries how she was learning and guided her. Learning occurred through her own effort.

(Vasala’s (Course writer) Evaluation Report)

In this study, the course writers did not act as knowledge-givers but as facilitators for the construction of knowledge and co-ordinators in designing friendly learning environments. The above finding has been predicted by many researchers (Perkins, 1992; & Jonassen et al.1999).

This research has shown that the most important role of the instructor is to develop a friendly learning environment to promote learning. The instructor made several visits to the student’s home to monitor and
facilitate the student learning rather than the student visiting the teacher’s place to learn. The learning situation was home-based learning, a significant change from school-based learning for these students. There were friendly learning conversations. The learning occurred with more comfort in their familiar environment, which might be the reason for students being more interested, encouraged and motivated for learning. This is an important point to study further because of the nature of the target group. The above findings demonstrated that students were self-directed learners and instructors created the learning environment to support self-directed learning by giving ownership and responsibility to the students and taking monitoring, facilitating and co-ordinating roles.

**Collaborative support for learning**
The experience in this study reveals that the students’ parents played a crucial role in their children’s learning. The study demonstrates that parents performed different roles such as providing resources, directing students to meet the necessary persons to get information, giving some information when children wanted it, support in selecting learning materials, and maintaining a friendly relationship with the instructor (course-writer). Moreover, parents encouraged and motivated their children to learn. Accordingly, a key finding is even though parents may not be able to read, write or understand the study program properly, most are happy to encourage and support their children’s learning. The significance of home-based or work-based engagement should not be under estimated, no matter how disadvantaged the home or workplace is socially or economically. Further, the study clearly shows that collaborative opportunities engaged the students in a wider community which provided multiple resources to promote learning.

The students met necessary persons and through inquiry, conversation, and observation they collected the information they needed. Furthermore, the study indicated the importance of peer support for the students’ learning. The students who collaborated with their friends gained different types of support for their learning. Some gained peer support to collect information. Others went to see the course writer or other resource persons accompanied by a friend. A significant finding is that those friends who accompanied the students also contributed to the resulting discussion with the course writer and the students. An example Abdul’s view of his student’s learning was

*In my 37 years in the field of education this is the first occasion when I got involved in a learning activity of this nature. I too got experience for my teacher education activities. It is my fervent hope that steps would be taken with the least possible delay to give this kind of education to all non school children who are now idling*

(Abdul, Evaluation report, 6 June).

The above findings show that the collaborative opportunities supported students in different ways and promoted the socialisation of the students.

**Design principles**

This study is important because, when examining the learning processes of the out-of-school children several pivotal design principles could be identified. These principles can provide enlightenment for designers and course writers in developing effective learning materials that can engage learners in an active and constructive learning process.

The study shows that a significant principle is to provide the learners with the opportunity to set their own learning goals. It is clear that the learners here were able to understand and were interested in learning because their learning was related to their context and it was useful for them so they could set their own learning goals and become actively engaged.
The study also highlights another important design principle: the importance of readiness for learning. It shows that designing learning to foster a learning culture promoted self-confidence and engaged the learners and that this principle was very crucial for the out-of-school context. Normally, out-of-school children belong to a low socio-economic class and they are an underprivileged and isolated group so it was particularly important to develop a learning culture before starting their learning. Sheldon and Biddle (1998) state that intrinsically motivated learners tend to demonstrate a stronger understanding of both simple and more complex material. They will demonstrate greater creativity and cognitive flexibility because they become more wholly engaged and absorbed in their activities, bringing more of their prior knowledge and integrative capacities into their attempt to gain new understanding and mastery. The current study supports these findings.

The principles that support the learner’s engagement and learning through real experience, also provide opportunities to link new information with prior knowledge and give them the opportunity to work with new information in a hands-on mode where learners are engaged to construct their own knowledge and gain higher-level understanding.

Providing more opportunities for interactive collaborative learning was another important design principle that emerged from the learning process and which promoted learner engagement. Especially in the out-of-school context, the learning materials engaged students in the wider society and they engaged different community members to collect necessary information. In the study, nobody pushed the student and the majority of the students did not even expect feedback from their instructors. They wanted to show the instructor what they had done. Bransford, Brown and Cocking (1999) point out that it is useful for young children to be actively engaged in making sense of their own worlds and children naturally learn when there is no external pressure to improve and no feedback or reward other than pure satisfaction.

The study shows that another important design principle is to provide opportunity and space for learner ownership and enough room for learners to have responsibility for the learning.

Another important design principle that emerges from the study is that it was necessary to provide learners with a friendly learning environment in order for them to be motivated. The study especially shows that student learning should be flexible. There were no rigid rules or fixed timeframe as in a formal school environment. There was opportunity for students to learn to relax.

In summary this study shows that the learners were self-directed because the design of the materials provided them with the opportunity to develop self-directed skills, self-motivation, self-evaluation, self-confidence and the motivation to be self-regulated. Constructivist design principles provided learners with ownership and responsibility for their learning.

Conclusion
The study provides significant insights into designing self-learning materials for out-of-school children. The constructivist theoretical approach guided the research to introduce a new path where learners are intrinsically motivated to learn and actively engaged in constructing meaningful knowledge for their real problems in collaboration with others. The findings demonstrate that learning is not necessarily tiresome, but can be enjoyable and exciting. The study concludes with a recommendation for a paradigm shift in educating out-of-school children – a shift from traditional instructional design methods to a constructivist approach.

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