A Learning to Learn Approach to Digital Inclusion in Social Contexts

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Abstract

This paper presents an approach to digital and social inclusion in which learning for digital inclusion is situated in the social context of the learners, and is based on authentic activities of project development that are meaningful in this context. The emphasis is much more on learning to construct and participate in a community of knowledge than on learning to acquire a body of knowledge. The approach includes two phases. In the first phase, digital inclusion is based on learning to create content for the internet. The students learn a language to create content for the internet developing prototypes of learning portals on subjects that are relevant for their community. The focus on creating learning portals as part of their learning for digital inclusion allows the students not only to address issues of using an internet language but also to address issues of using the internet for learning, leading them to explore a learning to learn perspective. In the second phase, the aim is to extend this perspective to the whole community making the students and the community work together to create a learning portal that can benefit the community. This methodology is being applied to a project of promoting learning for digital inclusion in poor rural communities of the Brazilian Northwest. The paper presents a brief description of the first phase of the approach in order to address the second phase, which is the main focus of the paper.

Keywords: digital inclusion, social context, situated learning, learning portals.

1. Introduction

In order to support learning for digital inclusion in social contexts we have developed an approach that involves two phases. In the first phase, learning for digital inclusion is based on the development of information technology projects in which the students learn an internet language and use that language to create prototypes of learning portals on a subject of their social context.

In the second phase, which is the main focus of this paper, the digital inclusion developed in the first phase will help to create social inclusion. The focus of the first phase on the development of projects of learning portals will enable the development of community projects, focused on the creation of learning portals, that can promote social inclusion.

In the next section, the main issues of learning theory addressed in this work, which come from its focus on constructive activities and authentic situations, are briefly discussed. In the following sections we describe an application of this approach to the development of a program of promoting learning for digital and social inclusion in poor rural communities of the Brazilian northwestern region.

2. Theoretical basis for digital inclusion in social contexts

According to contemporary theories of learning, the social and physical context of the situation in which learning takes place is an integral part of what is learned in the situation, and is what makes learning in the situation meaningful. These theories also emphasize the central role of constructive activity in meaningful learning. In addition, according to a situated learning perspective, learning is a matter of constructing an identity and of participating in a community of practice, so that learners can develop the capacity to act as members of the community in which this knowledge is situated and meaningful (Brown, Collins and Duguid, 1989; Lave and Wenger, 1991).

Therefore, in order to provide a productive learning environment, the context of the learning activities, in addition to the content and dynamics of these activities, should be an issue to be carefully considered in the design of the learning environment. For example, studies that compared the conditions in which learning develops in school with those that are present when learning happens out of school have pointed out to the importance of learning in authentic situations (Resnick, 1987).

Authentic situations are situations that take into consideration the activities that people develop in the real life contexts in which the knowledge learned is applied, so that learners can understand the generative power of the items of knowledge that they are learning (Greeno, 1989; Brown, Collins and Duguid, 1989).

In our work to support learning for digital inclusion we have taken a theoretical perspective that is in line with these views of learning, and have developed an approach in which learning for digital inclusion occurs in authentic situations.

In these situations, learners will learn information technology languages and ways of expressing information in these languages, through the development of information technology projects that address real problems of their community. One of the central aspects of media emphasized in these projects is the use of audiovisuals which allows us to address contextual aspects (social, cultural and physical) in more effective ways.

3. Social contexts and authentic activities in learning for digital inclusion

In the first phase of our approach to digital inclusion we involve the students in the development of information technology projects in which they can learn information technology languages and become able to express themselves in these languages. In the program that we are developing in the Brazilian northwestern region, the language they will learn is HTML and the projects in which the students will work to learn the language include the development of prototypes of learning portals in a subject that is relevant to the social context in which the students live.

The students come from poor rural communities in a region that has a potential for the development of an agriculture that can be used for the production of biodiesel, which is viewed as a way of generating income and promoting social inclusion to these communities. A program of training farmers to cultivate plants that can be used to produce oil is being developed in the region as part of a government plan to increase the production of renewable sources of energy by small farms in order to provide social inclusion. This is the social context of the community in which our program of digital inclusion will be applied.

Therefore, the social context of the digital inclusion students is characterized by the following:

- An agricultural community that is changing to a new kind of agriculture and needs to learn new agricultural techniques.
- An agricultural community that needs to participate in a new kind of business to sell the product of their farms to the production of biodiesel.

In this context, the prototypes of learning portals that the learners will be developing to learn HTML will be based on the training that will be given to the farmers in the new agricultural techniques. To be used as part of the content of these learning portals, we will produce audiovisuals of the training program during its development, with the participation of the students.

This will provide authentic situations (the training of farmers of the community in the new agricultural techniques) and constructive activities (the building of real learning portals in a real context, rather than learning solely through lectures and exercises).

4. Building learning portals to digital inclusion in communities of the Brazilian Northwest

The technology that we will be using to develop the learning program includes wireless notebooks, as there will be little infrastructure to install a classroom with desktop computers in the places where the rural communities are located. In addition, most of the information acquisition for the design of the portals will be made in the field, during the training of farmers in the new agricultural techniques, where the audiovisuals will be produced.

The whole program of learning for digital inclusion will take one year to be applied in a rural community of the northwestern region and the plan includes a second year in which another more distant rural community will be reached. The program includes an introductory course in which the elements of the HTML language will be introduced to the students, and practical activities in which the students will work in the development of the projects of learning portals.

A summary of the activities that are planned to be developed in the program of learning for digital inclusion, with regard to the development of the projects of learning portals, is presented below.

1) Obtain information for the development of the learning portals, which will involve the students and the farmers working together, as well as the agriculture instructors.
2) Produce audiovisuals about the subject, integrated with the training program.
3) Design of the prototypes of learning portals by the students, using the audiovisuals produced.
4) Implementation of the prototypes of learning portals by the students, following an introductory course on the HTML language.
5) Expose the prototypes of learning portals to use by people to obtain feedback.

5. Learning to learn for digital inclusion in social contexts

One of the main aspects of our approach to digital inclusion in social contexts is that in order to learn an information technology language (such as HTML), the students develop information technology projects in which they use that language to address real issues of their social context. These projects provide the authentic activities that make their learning for digital inclusion meaningful.

However, the more central aspect of the approach lies not in the fact that learning is based on authentic project development activities, but in the fact that the projects that are developed by the students in their learning processes are projects of learning portals. This allows us to address two issues that are important for pursuing the next phase of the digital inclusion program, which points to independent learning.

First, in the process of creating the content for their learning portals the students become authors of the knowledge that need to be learned by the people of their community to improve their lives (the new agricultural techniques). In this process, they gain an understanding of the issue of knowledge representation in learning portals that is also grounded in an authentic context and, therefore, is more comprehensible to them.

Second, the use of audiovisual media to represent part of the knowledge that constitutes the content of the learning portals allows to address in a more effective way the tacit aspects of the knowledge as well as its social, cultural and physical dimensions.

Therefore, at the end of this process, the students have not only acquired literacy in ways of expressing information to the internet but also acquired literacy in ways of learning through the internet, as they have became prepared to understand as well as to create and use learning portals.

This is a very valuable literacy because it is a literacy that gives them more autonomy to learn from the internet. It is also a literacy in learning to learn, which brings them further empowerment.

The second phase of the digital inclusion program follows from this point and is based on the creation and use of free learning portals to support social inclusion. The prototypes of learning portals developed by the students in the first phase of the digital inclusion program will now evolve to become a free learning portal on issues of biodiesel production.

This may have several further consequences to the community. First, the learning portals can continue to be developed and become a future source of information to farmers, providing for their digital inclusion too, turning into an information technology artifact that is relevant to the farmers community. Second, the learning portals in its continuing development can be a way of connecting the farmers to other communities in the biodiesel production chain, improving their connectedness and digital inclusion in useful ways.

Furthermore, the work of creating a learning portal with the participation of the community, using the prototypes of learning portals developed by the students in their digital inclusion projects, is an important step to insert the community into the information society.

Therefore, in order to support the second phase of the digital inclusion program we need to develop a framework for the creation and use of free learning portals, which is discussed next.

6. A framework to support the design of free learning portals for digital and social inclusion

The main issue addressed in the design of free learning portals is the learner autonomy to learn. Free learning portals should provide a flexible and adaptive support to the learner, facilitating independent learning and making possible to the learners learn according to their interests and needs.

In addition, in our approach to digital inclusion, learning is situated in social contexts. Therefore, an issue to be addressed in the design of a free learning portal for digital and social inclusion is the role of the context in learning. Taking this issue into consideration in the design of a learning portal leads to the need of representing the contexts of learning as central components of learning interactions in the portal, and of situating learning activities in these contexts.

To represent the context of learning in learning environments, we have developed an approach that is based on a model of situations (Akhras, 2005).

Designing the learning portal according to this model means to organize the knowledge to be learned in the portal in terms of situations, rather then solely in terms of information to be accessed. Situations are broadly conceived to denote spaces for learning interaction, which may include information to be accessed, but with an emphasis on situating learning in context and activity. This leads to a situation-oriented approach to the design of learning portals.

6.1 Situation-oriented design of learning portals

In a situation-oriented approach to the design of learning portals the portal pages are created with a focus on the situation content and dynamics. The content may include sources of information as well as other entities, and the dynamics may include ways of accessing information as well as ways of developing other kinds of interaction with the entities of the situation.

Taking a situation-oriented approach to the design of learning portals involve the consideration of the following general principles (Brown, Collins and Duguid, 1989; Bednar, Cunningham, Duffy and Perry, 1992):

- Learning situations have to be authentic, portraying activities of the real life contexts in which the knowledge learned is applied.
- Learning situations will embody the social and cultural aspects related to these contexts, reflected, for example, in the practices of members of the community, their common views, and their tools.

These aspects of learning situations may appear in the portal in the form of images, sound, text, graphics or computational simulations.

To provide ways for learners to develop meaningful and productive learning interactions, the opportunities for activity in learning situations may include the following:

- Action events (including ways of accessing, using or creating information, or other entities of a domain, in the context provided by a situation).
- Communication events (including ways of communicating with other learners or living entities in the context provided by a situation).

Through these kinds of activity, learners interact in a situation taking the physical or conceptual entities of the situation as objects of their actions and producing new or transformed entities. In this process they may also communicate to each other or to the living entities designed to perform particular roles in the learning situation.

In addition, the fact that a free learning portal must be adaptive to facilitate independent learning leads to the need for monitoring learning situations.

6.2 Monitoring learning situations

Monitoring learning situations allows us to collect meaningful data about the interactions that occur in these situations. The data collected will be analysed to look for desirable characteristics in the learning process developed. This analysis will be used to guide the adaptation of the learning portal, and the adaptation is in terms of providing access to the learner, to those learning situations that will be more helpful to the learner in terms of facilitating the development of the desirable characteristics in the next steps of his or her learning process.

Therefore, these two concerns - situation-oriented and adaptive – are the main requirements of free learning portals for digital and social inclusion.

On that basis we have produced a general design of a free learning portal to be used in our work with the community, in the second phase of the digital and social inclusion program. This general design, which is briefly described in the next section, will support the work to extend the prototypes of learning portals to create a free learning portal.

A central aspect of a free learning portal is the adaptation of the content (the learning situations) to the needs of the learners, in the course of the learning process. This requires the design of a system intelligence that can provide the kind of adaptation needed (Akhras and Self, 2000).

7. A free learning portal for digital and social inclusion

The learning portal that we have designed on the basis of the framework discussed in the previous section is constituted of a set of web pages which characterise learning situations. Each situation contains audiovisual content of the knowledge to be learned and its context, and means of interacting with this content. The access to these pages is based on a learning strategy which takes into consideration the learning goals, the learner previous course of interaction in the portal situations, and the knowledge acquired by the learner in these situations. The portal also offers the possibility of choice of situations to be accessed by the learner. On the basis of this, the portal will operate as follows.

1) At each moment a set of situations (web pages) which attend the learner needs in that particular moment of his of her learning process is presented to the learner for a choice of a situation to access next.

2) The choice of the situation to access next will be made by the learner or by the portal (by the adaptation system) according to the moment of the learning process or by learner choice.

3) Accessing a web page makes the learner enter the learning situation characterised by that page allowing him or her to interact with the content of that situation.

4) All interactions occurred in a situation that are relevant to obtain the observations needed to adapt the portal to the learner´s needs are registered by the portal (by the adaptation system).

5) On the basis of the registered data of the interactions occurred in the web page, the portal captures aspects of the learner performance in the learning situation, such as the knowledge learned or failed to learn in the interactions with the situation, determining the learner´s state of knowledge and the course of her or his learning process. This will provide information to the adaptation system of the portal.

6) From the learner´s state of knowledge, the learning goal, the learning situations available (with their content and dynamics), the previous occurrences of the learning process, and on the basis of a defined learning strategy, the adaptation system of the portal determines the learning situations that are more beneficial to the learner, at that moment of his or her learning process. This corresponds to the adaptation of the portal to the learner´s needs.

7) As a result of this adaptation a set of situations, and corresponding web pages, are provided which can attend the current needs of the learner, and a new cycle starts, from the step (1) above, until the intended learning process has been completed and the learning goals have been achieved.

8. Towards community-centred design of free learning portals for digital and social inclusion

In the first phase of the digital inclusion program, students from a rural community will be creating prototypes of learning portals on a subject that is relevant to the social inclusion of their community. In the second phase of the digital inclusion program, these prototypes of learning portals will evolve to become a free learning portal on the subject of agricultural techniques for the production of biodiesel, to be used by the communities involved in the biodiesel production program. The work to move from the prototypes, which were developed to the purpose of learning for digital inclusion, to a complete learning portal to be made available to the communities for free learning, is a work of design that should involve the users. After the digital inclusion program, in which the students also acquired literacy in issues of learning portals, the students are now able to participate in the design of a learning portal that can be more attuned to issues and views of their community.

This characterises an approach of community-centred design of learning portals for digital and social inclusion, which will be explored next in our work to support digital and social inclusion in rural communities of the Brazilian northwest.

9. Conclusion

We have presented an approach to learning for digital inclusion which takes into consideration the social context of the learners and is based on authentic activities. The approach includes two phases. In the first phase, learning for digital inclusion is based on

the development of prototypes of learning portals in which the students learn the HTML language and use that language to create prototypes of learning portals on a subject that is relevant to their community.

In the second phase, which has been the main focus of this paper, a more advanced approach is explored with the aim of working with the members of the community to prepare them for independent learning and also to involve them in creating a free learning portal on issues of their social context (biodiesel production) to be used to promote and facilitate social inclusion.

The main characteristics of the approach, are:

The construction of learning portals – the construction by the learners of learning portals on subjects of the learner´s social context using visual representations of this context, allowing the students to deal with issues of their social context in project-based constructive activities that will be part of their learning for digital inclusion.

The use of audiovisuals – the production and use of audiovisuals on subjects of the social context of the learners as a way of providing visual representations of aspects of this social context to be used in the projects that the students will develop as part of the digital inclusion program.

The focus on learning to learn – the focus on learning to learn will allow us to go from literacy in digital technologies to literacy in learning from digital technologies.

The application of a community-centred design approach – the design of free learning portals as an activity that will involve the community will enrich the digital inclusion process and ground the design of the free learning portal on an authentic context.

Our main aim has been to situate learning for digital inclusion in the social context of communities, creating the conditions for the members of the community to become independent learners, so that they can provide for their own further digital and social inclusion.

The methodology of digital inclusion in social contexts is a way of addressing the inseparability between knowledge and context and of connecting digital inclusion to social inclusion.

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