

Digital Inclusion: Best practices from E-learning.

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Abstract: 'e-Learning for e-Inclusion' (EL4EI) is a European Union project, funded by the programme 'e-Learning'. The project seeks to build a community for those with valuable expertise regarding the use of e-learning for digital inclusion. Thanks to an innovative means of recovering and processing material, and a cognitive approach instead of a pure technological one, our project is able to more clearly and rigorously point the way towards important new solutions that had been all too often overlooked, due to the predominance of an exclusively technical focus on the issue. In this paper we will a) describe the new methodology used to analyse, filter and present results and b) describe some key results gathered so far.

1. Introduction

'e-Learning for e-Inclusion' (EL4EI) is a European Union project, funded by the programme 'e-Learning'. The project seeks to build a community for those with valuable expertise regarding the use of e-learning for digital inclusion. Furthermore, it sets out to gather and catalogue relevant cases of 'best practice', and ultimately, to compose an e-learning charter which will be a reference tool for professionals working towards social inclusion.

In sections 2 and 3, this article presents three conceptual innovations in the pursuit of social inclusion through e-learning: a reconsideration of the concept of digital inclusion from a social focus and in terms of empowerment, information processing from a cognitive perspective of problem resolution, and thirdly, an ontological approach to the indexing of information obtained.

Sections 5 and 7 feature a practical presentation of key results gathered thus far. In the interest of brevity they have been curtailed to those involving issues of multiculturalism, social inclusion and e-learning.

2. Objectives

Most projects concerned with digital inclusion tend to centre their focus on issues of hardware: donation of computers, cabling homes, the use of wireless devices, etc. Though such issues are obviously unavoidable, they are not all there is to the matter.

Moreover, the ultimate beneficiary being targeted is all too often ill-defined. Generally they are of two types:

First, we have the handicapped people; in which case the targeted beneficiary is usually well analysed and segmented into specific groups, given that

considerations are different for the blind, the colour blind, the visually impaired and so on.

Then, we have the general fallout of the so-called Digital Divide; in which case the single identifying characteristic is one of computer illiteracy. Thus one finds little distinction being made among such diverse targets as senior citizens, the unemployed, convicts, disadvantaged youth, and so forth. The blanket approach taken for all these groups is to organise practical courses wherein these diverse individuals are taught the *how to* of surfing the net, e-mailing and whatnot.

Considering the undifferentiated reasoning underlying such tactics to be specious, we propose an alternative approach based on the following imperatives:

1. Overcoming mental barriers as opposed to simply technological ones. We find at present that major causal factors of marginalisation from the information society are those such as the mistrust often felt towards new technologies and the lack of any content attractive or useful to either the socially excluded or those at risk of being so.
2. An approach based on empowerment. We hold that what is important is not so much knowing how to use, for instance, Netscape or Outlook, but rather the educational and liberating potential of new technologies. We seek to make the internet an instrument for integrating the socially excluded by using it to equip them with the skills that will make them employable in the information society. Furthermore we seek to develop their capacity to think critically, to form their own political views and to organise themselves as citizens and cultural groups. The potential realisation of such substantial goals advocates thinking about ICT in more social terms rather than through a reductive technical approach.

3. Methodology

Normally, the description of best practice is carried out through detailed reports. As if it were some clerical task, dates, places and names tied to the experience are compiled, the context of the experience, the characteristics of the responsible organisation are assiduously described, and so forth. Such reports function well enough to document work done and as a tool in the pursuit of further funding and support. However, towards fulfilling a more scientific role they have the following drawbacks:

Given that the information is highly contextualised, it becomes difficult to discern that which may be applied successfully elsewhere from that which is tied to the specificities of the occasion.

Due to the high degree of detail, it can often be difficult to determine which information is the most important or relevant. Though not undoable, it is unwieldy to have to sift through a twenty-page document in order to access a very precise bit of information on, say, something such as how best to present a virtual forum to a group of women senior citizens.

Rather, we favour a cognitive methodology, analysing best practices as proposals for solving a given problem. In such an approach the goal is not to document the experience in detail – instead, it is to establish what problems are to be solved, what possible solutions are available and how effective each one might be.

This approach is specifically based on the pioneering work carried out by the architect Alexander [1], and in particular, on his developments within the field of cognitive science and artificial intelligence [2]. The idea is one of an approach

through cognitive patterns, in which experiences are considered as examples of patterns for how problems can be solved.

Thanks to this type of analysis, an experience becomes a pattern, a prescription for solving a problem from a given perspective. To do so, one adapts a system for classifying experiences [3]. The following is an outline of the main considerations used in analysing best experiences:

Purpose: The objective of the practice analysed.

Problem: The problem which the practice seeks to resolve.

Solution: In what way the practice offers a solution to the problem, within the context in which it appears.

Target: The segment of the socially excluded population at which the proposal is aimed.

Actors: The different actors involved in the practice.

Effects: How things will change once the practice is adopted.

Implementation: Practical instructions on how to put the practice to use.

This systematic means of classifying data produces information which, unlike in the situation described at the beginning of this section, brings forth the generally applicable elements of the experience, while at the same time only necessitating the annotation and processing of genuinely relevant information, leaving aside other data for more traditional reports.

Once the information is compiled using the cognitive models [described in 2], different patterns are brought out, in a systematic and directed way, from the cases that, in terms of empowerment (as described in the previous section), use e-learning for social inclusion.

4. Description of technology

Cognitive patterns are a powerful tool for ordering information relevantly and systematically. This facilitates research enormously, as explained in the previous section. Furthermore, the intuitiveness of the cognitive pattern means that it is also highly recommendable for the organisation of information on a website.

This encourages us to implement the findings of cognitive analysis in a programmable ontology facilitating the indexing and the locating of information, such that anyone interested in the use of e-learning for social inclusion could find the solutions proposed in the easiest possible way.

Technologically, we settled on the use of topic maps [4]. We did so because topic maps offer a good general framework for building interconnected content networks. Hiring a large company to custom build a system is a solution which, aside from being expensive, is difficult to transport and maintain. Whereas a system based on topic maps is standardized, flexible and easy to maintain, as well as independent from the computer application being used.

Most vitally, the advanced architecture of topic maps facilitates the conversion to computerised format, of something, such as methodologies against social exclusion through e-learning, which would seem to not lend itself easily to quantification.

Finally, we greatly appreciated the way topic maps facilitate the conversion of information into visual form. In the field of digital inclusion it is particularly necessary to use structures that are intuitive and easy to understand and process.

Hence, the dynamic visual maps expressing the breakdown of subjects are extremely useful.

Presently, we are at work processing the best practice cases as they come in, abstracting the relevant cognitive patterns and including them in an ontology on social inclusion which is being developed in XML using topic maps. For October, we expect to have the e-learning for social inclusion library fully up and running. The vocation of the library is to become a reference tool in the field of social education and, potentially, a point of reference in the future theoretical development of e-learning.

5. Developments and achievements

At the present stage of development we have a partial ontology of problems and solutions available to us. In addition, we have a series of 'data mining' tools for connecting data and gathering solutions in the most useful way possible.

This is vital, because the members of the consortium often propose solutions described in an overly anecdotal way. For example, one 'best practice' involved using karaoke in teaching children to read. By means of the ontology and other tools it was possible to re-classify this experience. On one hand it was classified as a motivating process, based on entertainment as a key psychological factor, on the other, as a process whereby ICT was used to instil knowledge that is basic for social inclusion and necessarily previous to any digital inclusion (i.e. literacy)

One of the key results of this process has been to produce a rigorous classification of problems and solutions. This will greatly facilitate future discussions among experts, which will articulate recommendations and best practices to be presented in the European Charter for digital inclusion.

The rate at which different problems and solutions have appeared in reports and documents has been statistically calculated so as to establish the relative importance of each. We consider a key finding of this study that – though most of the actions taken towards inclusion involve entirely technical solutions and training – when the cases of best practice are studied exclusively, more than half of the proposals involve motivation, the development of specific contents and more cognitive solutions.

More specifically, the findings show that, among the more than 600 activities in favour of digital inclusion analysed, about 40% of the solutions proposed were exclusively to do with the improvement of technical infrastructure (affordable computers, the cabling of cities etc.), almost 75% combined such infrastructural improvement with the teaching of technical skills (such as the use of browsers and e-mail). However, when only the 100 best practices so far gathered are considered, it is found that in the majority of these solutions (about 50%), the key to their success was the motivation of subjects through methodologies and tailored content.

In the light of such findings it can be quite interesting to consider the failure of digital inclusion projects such as the Spanish state's Plan Info XXI. In this particular case, the plan was to increase the number of internet users in Spain by a million; what in fact happened during the period of the project's operation was that the total number decreased.

One of the most valuable achievements of this project thus far has been to clearly indicate the need for a new digital inclusion paradigm. Of course, none of this goes to deny the need for technical infrastructure, since, obviously, without a computer or network there would be little sense in teaching the use of new technologies. But rather, the point is that, such exclusively technical considerations are a wasted effort if not backed up by a cognitive plan to motivate the users.

6. Results

The following is a list of the five strategies that, at this stage in the research, seem the most promising in terms of establishing best practice in the use of e-learning for social and digital inclusion.

In first place is the strategy of combining teaching ICT with other non-digital knowledge equally important to social inclusion. An example of this approach is the case of a gypsy community wherein computers were used as a tool to prepare for a driving exam; the usefulness of this tool was enough to convince several adults from the community to participate in e-learning activities. Similarly, it has been found in other best practices that, in order to motivate adults to use such tools as Microsoft Office or a web browser, it was vital to show to them how such knowledge would help them find employment.

This is an effective strategy for Three reasons. Firstly, the students are much more motivated, since they associate learning ICT with something of genuine concern to them (obtaining a driver's licence, a job etc.). Secondly, there is an efficiency factor to combining learning purposes; that is, at the same time the learners acquire internet skills, they also acquire others (such as learning how to drive). Thirdly, the fulfilment of the goal of social inclusion is greatly enhanced, given that not only digital skills are imparted, but also other skills which, though not digital, are nonetheless vital to social inclusion.

The second key strategy is communication. Our analysis of failures has demonstrated that if the proposal is not properly communicated, it will not fulfil its objectives. There are innumerable websites dedicated to helping women or immigrants that, however well they may be designed and organised, don't succeed in doing so because the 'target' does not know they exist. Communication needs to be appropriate to both the target and its geographical situation – i.e. if it is local, national or international in character. Furthermore, it must make use of non-digital means to deliver the message, given that the target group is precisely the digitally excluded.

A third strategy is to establish peer to peer teaching systems. That is, in the degree to which it is possible, it is desirable for the students to teach each other. This can be structured either formally or informally. In the former case, the students are 'promoted' to the level of teachers; the important implication here is that if enough students are inspired to adopt a teaching role, sustainability is guaranteed. Meanwhile, in less formally structured situations, the help the students offer significantly reinforces the cognitive relevance of what is being explained and greatly boosts motivation.

The fourth strategy is to create informal environments, and has the advantage of being applicable for various target groups. For instance, the traditional class environment for teaching computer skills can be very boring for children who are not used to such. Organising something more informal and experimental – where the children use the computer as a toy – can be highly effective. Likewise, such formal teaching environments might be intimidating for immigrants whose cultural background is significantly different from the host country's; they may feel more

comfortable in less formal circumstances. Moreover, much the same can be said with regards to certain groups of women and senior citizens.

The fifth strategy is to use teachers similar to the students themselves, something that is particularly well documented in cases of e-learning focused towards women. Since digital technology tends to be thought of as 'man's world', adolescent girls often don't feel motivated by it. Hence, it can be advantageous to use female monitors to explain the use of a given e-learning environment, as well as female avatars to present content. Though the effect may be a subconscious one, it can be important nonetheless, as it goes towards breaking the stereotype that only men can handle ICT. A similar phenomenon has been observed in the case of immigrants; an instructor from the same culture tends to be more motivating, however well the immigrant speaks the local language.

7. Business applications

Though our study is focused on the socially excluded, thus having a basically ethical and social objective, many of the practices being compiled can also be perfectly useful for other groups. In fact, one of the criteria used in putting together the cases mentioned in the previous section was that they also be usable outside of the social exclusion context. The following is a cursory overview of how practices drawn from our study can also be effective in other types of projects.

Firstly, all the findings regarding accessibility for those with physical and sensorial handicaps, can also be applied to a commercial e-learning venture. Obviously, both from an ethical and commercial point of view, it is important that, for example, visually impaired people are able to use the e-learning application made available to them (for the purpose of, say, learning a foreign language).

Following similar reasoning, what has been said about excluded children can be entirely pertinent to perfectly integrated children as well. That is, formal learning situations might be counterproductive, whereas informal environments learning through play can be much more motivating to them.

A large part of our studies are centred upon developing universal user interfaces, whereby students from different cultures can intuitively use the same e-learning application. Such findings are obviously useful to any e-learning project, commercial or otherwise, targeted at international or multicultural users.

Combining two types of learning seems to us to be a potentially powerful strategy, as well as an underused one in the e-learning sector. If a digital project can be successful in seeking to motivate a group, with such little initial proclivity such as the gypsies, to use ICT to acquire skills (driving skills in this case), the potential of such strategies must presumably be quite large. For instance, one might think of learning at the same time the language, history and geography of a country.

Finally, teaching by people from the same group as the students is a strategy which is both underused and potentially capable of making the development of e-learning products more efficient and less costly – thus more competitive. If a significant amount of learning is based on the students mutually supporting each other through on-line networks, the implication for the company involved is a course that transmits more relevant information more cheaply.

8. Conclusions

In summary, E-learning 4 E-inclusion, as it is in its present state, demonstrates how the practice of digital inclusion has to combine both technical and cognitive approaches. Teaching technical skills involving the use of a computer or internet turn out to be useless if unaccompanied by motivation and contextualisation. The conjunction of these elements is what makes such know how genuinely useful to the target group and effective in the fight against social exclusion.

Thanks to an innovative means of recovering and processing material, our project is able to more clearly and rigorously point the way towards important new solutions that had been all too often overlooked, due to the predominance of an exclusively technical focus on the issue. In essence, the strategies put forth are moving towards a new paradigm, one based upon more informal teaching environments, wherein the communication among peers is fundamental and damaging stereotypes regarding new technologies are avoided. Of course it goes without saying that these practices are all unviable without a necessary minimum of infrastructure, i.e. access to a computer and the internet. However, it is just as clear that investment based on providing technical means is ineffective when unaccompanied by a new methodology, one based on contextualisation and motivation. Rather, the battle against the digital divide must be waged on both fronts.

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