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Dimensions of flexibility - Students, communication technology and distributed education

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Abstract

Flexibility is a frequent topic in any discussion of higher education in general and "alternative" forms of education, such as distributed education, in particular. The term is usually associated with change, but there has been little attempt to analyse the concept in further detail. This is surprising, since flexibility is often seen as the distinguishing attribute of this type of education. It is therefore the aim of this article to clarify the concept of flexibility by relating it to students in distributed education and their study situation. In doing so, I hope to create a platform for further research and development in the field of distributed education.

Keywords: Flexibility, distributed education, communication technology, ICT, students context, daily life.

Introduction

Flexibility is now a key concept in some areas of political, administrative and academic discourse. It is remarkable, however, how vague and little nuanced any discussion of the notion often seems to be. In terms of content, it would seem to suggest a form of change, while remaining unclear as to what this change implies. Normatively, flexibility is often taken for granted, being a quality everyone must aspire to if they are to function in a social context. In the field of distributed education too, flexibility has long since gained currency and can be said to be a firmly established norm (Collis & Moonen, 2001; Edwards, Nicoll, & Lea, 2002).

The point of departure of this article is that there is very little research that seeks to analyse the concept of flexibility in relation to students in distributed education, despite the fact that alternative forms of education have a long history and are widely practised. In many ways this reflects the weak theoretical foundation found in research and development in relation to distributed education (Garrison, 2000; Perraton, 2000b; Saba, 2000; Støkken et.al., 2002; Watkins & Schlosser, 2003). There are, however, a number of interesting exceptions that attempt to address the problem. Examples of this are Støkken's (1996) discussion of the student's role, Nylehn's (1996) discussion of the role of technology in distance learning and Edward's (1997; 2002) discussion of the relationship between distributed education and social

change. The weakness of these contributions in relation to the aim of this article, however, is that beyond a limited extent they fail to address the concept of flexibility as such.

If on the other hand we look outside the body of research dealing with distributed education, it is possible to find a number of other interesting contributions. Sayer (2000) discusses flexibility from a scientific-theoretical point of view, Nylehn (1997) discusses the concept on the basis of what it means for organisations, while Hanseth et al (1996) discuss it in relation to technology and information systems. Each of these approaches affords in its own way a good starting point for a better understanding of flexibility. However, it is necessary to follow up these contributions by clarifying the concept in relation to what flexibility means for students in distributed education. In this article, this is done by examining the aforementioned contributions in the light of existing research in the field of distributed education. To do so, we begin by looking at the relationship between students and the educational institution and between students and their everyday environment or setting. At the same time, the position of technology in students' flexibility is allotted particular weight. The objective is to identify different aspects of student flexibility and to highlight factors that are influential in creating this flexibility. In this way I hope to make a contribution towards clarifying what we seek to achieve when flexibility is an objective, together with the factors that serve to increase/reduce flexibility, and to say something about the consequences of flexibility. My general aim is to help establish a useful platform for empirical research and development work in the field of distributed education.

Distributed education, development and characteristics

Although distributed education tends to be associated with the growth of the information society, this type of learning has long traditions going back to the correspondence school that flourished around the turn of the previous century (Armstrong, 2002; Støkken, 1998). From the 1980s, distributed education once more came to the fore as a number of countries set up open, flexible universities, with the UK's Open University being the best known (Perraton, 2000a). In time, the traditional higher education institutions have also come to adapt to the notion of flexibility. New learning formats, whereby the requirement for personal attendance on campus has been reduced, have come about as a response to the new needs of students and society at large (Albach, 1999; Edwards, 1997; Perraton, 2000a). In Norway, for example, a move was made towards integrating this type of education in the established education system through the establishment of SOFF[1] in 1990 (Gunnar Grepperud, 1996). Today, there is a marked increase in the number of students following such types of education, both in Norway and in other parts of the world (Perraton, 2000a; UNESCO, 2001).

One of the distinguishing features of distributed education is that the educational institution does not expect students to put in regular attendance at a campus. With the help of various types of communication technology, everything from letters to the Internet, students can study at home, at work or in other locations variously suitable for study. In this way, new groups of students who for various reasons cannot follow conventional teaching programmes have found a place in higher education. (Gunnar Grepperud, 2005; Støkken, 1996). This type of education is found in different forms and under different names, such as distance learning, flexible education, open learning and e-learning. In discourse it may be associated with lifelong learning, adult education, continuing education and not least the new knowledge requirements of the information society (Edwards et al., 2002). Variations in terminology are discussed by e.g. Grepperud (2005) who shows how application of the concept in relation to different forms of alternative

education varies. Within the different terms we find varying concepts of the same phenomenon and the same concept used of different phenomena. Grepperud argues for the use of *flexible education* as the most appropriate collective term. Simultaneously he urges the use of terms that best serve the particular purpose of the phenomenon being described and analysed. The main thrust of this text is the analysis of education offered mainly off-campus, distant or local. This being so, I find the term *distributed education* most comprehensive for the phenomenon I wish to examine. This is also reflected in what is my primary concern in discussing the concept of flexibility. My main focus, therefore, is on what it means for the students to follow a course of study in a location other than a campus. Flexibility in relation to factors such as progression and choice of learning formats will be given only minor attention.

Student, educational institution and the student's everyday context

In order to better understand what flexibility means for students in distributed education, I shall start with some general considerations on the content of this notion. I shall attempt to go behind the concept's normative aspects and instead give it an analytical basis by looking at what it involves and how it can be interpreted.

Flexibility as both stability and change

A good starting point in trying to grasp the meaning of flexibility might be to go back to the original meaning of the word, which comes from the tree's ability to return to its starting position, even when it sways in the wind. Flexibility describes the tree's capacity to bend and then recover equilibrium (Sennett, 1998). Sayer (2000:116) takes a similar view when he sees flexibility as phenomena's: *"[…] ability to maintain their integrity and operate in a variety of different settings."* The structure's ability to maintain its integrity is here the basic mark of flexibility. What distinguishes this interpretation of flexibility from how it is often presented in discourse is that the phenomenon's ability to maintain its integrity is the key idea. Flexibility thus indicates the stable components of a phenomenon that will guarantee its continuing existence. The phenomenon may be a system, such as distributed education, or an actor as in this article where the focal point is distributed students.

At the same time it is worth noting that Sennet also emphasizes change as an important element of flexibility, but as a means, a force for achieving stability. In other words, in order for something to maintain its integrity, change may be necessary. This corresponds to Nylehn (1997:4) when he says that: *"Flexibility is the ability to vary, both by functioning in different ways in given situations and in being able to tackle different situations in a variety of ways"*. In order to understand the change component in flexibility, he divides the concept into *structural flexibility* and *spontaneous flexibility*. Structural flexibility represents changes within given limitations, while the spontaneous element represents the transition to something new. It is worth noting here that " transition to something new" does not necessarily have to stand in contradiction to Sayer's (2000) assertion that basic structures must be preserved as a condition for flexibility. It is rather, as Nylehn (1997) also implies with reference to Agryris and Schön (1978), a matter of different degrees of change. In practice it is often a matter of making small adjustments in order to meet external pressures, and changes are often limited to rhetorical statements in planning documents.

Flexibility and contextual factors

A setting, according to Sayer (2000), can be understood in terms of *contextual factors*. The contextual element here is the concrete situation surrounding a phenomenon, without this being decisive for either the phenomenon's essence or expression. Although the setting is not a determinant, it will nevertheless exert an influence on the phenomenon and thereby on any phenomenon's flexibility, including students' flexibility and the theme of this article. With this as his starting point, Sayer draws up a basic distinction between the structural qualities of phenomena and their setting. This definition of flexibility in turn requires insight into the phenomenon itself, while phenomena must also be interpreted contextually. This will also be the point of departure for our further study of the concept, when I shall tie in the foregoing comments to students in distributed education.

Based on the above, I shall take the following as a working definition of flexibility: *Qualities that help actors and systems to remain the same even though the setting changes and even if they move to a new setting. These qualities may be the ability to change but only as a means to maintaining integrity*. Together, these flexible properties comprise the structural aspects of phenomena in the sense that they contribute both to enabling and inhibiting action (Bhaskar, 1989; Sayer, 1992). The definition also implies that the flexible properties are first revealed on contact with the phenomenon's setting.

Flexibility and how students relate to the educational institution

A basic feature of being a student is formal association with an institute of education (Edwards, 1997). According to Gidden's (1984) theory of social structure, this association is formed in the first instance by the formal and informal rules that set the framework for the actors' room to act. Grepperud et al. (2004a) describe this relationship through e.g. flexible students' degree of self-determination in regard to their rate of progress and their influence on course form and content. With reference to their empirical studies, they further show how education based on predetermined curricula limits the student's room to act. The educational institution, through provisions relating to form, content and progression, constrains students' ability to vary in relation to when and where they choose to study.

In the second place, according to Giddens (1984), students' relationship to the educational institution, and hence their room to act, is constituted by the resources to which the different parties have access. The forming of rules and norms therefore depends on the integral power balance of these relations, and will be manifested through the party with the opportunity to form them and through the possibility of renegotiation. The power relations between student and educational institution will thus determine, among other things, the student's degree of freedom to make use of different settings and thereby also their flexible properties. The educational institution will generally tend to be the stronger party by virtue of the formal power it has to sanction students through the right of certification. If students fail to follow the given rules, they may lose their right to be a student. At the same time, each educational institution needs students in order to exist. From the student's point of view, this can be a resource in itself. An educational institution must accordingly take into account at all times students' needs and wishes.

Simultaneously, students will also enter into other structural relations, but in this case as employees, family providers, etc. Although these relations in themselves do not make the student into a student, they will be highly significant for the shaping of student life. Grepperud et al. (2004a) argue for instance that moral support and help with practical arrangements on the part of employer and family are decisive for the student's study situation. The employer's acceptance of the student's right to use the work computers for the

purpose of study, for example, will play an important part in determining how the student relates to the educational institution.

In the light of the foregoing discussion, therefore, students' flexibility will primarily be formed by their relations with the educational institution, but other important relations in which the student is involved will also carry significant weight. These other relations make up what I have previously called the student's context or setting. Analytically speaking, structures in the student's everyday life will therefore provide the context in the relations between student and educational institution. In what follows, I shall look more closely at how these settings can be described in terms of students' flexibility.

Flexibility and students' settings

I have earlier argued the case that students' flexibility must be understood in light of the extent to which their ties to the educational institution give them room for action in relation to their everyday setting. Taking a similar approach, Støkken (1996) describes flexibility as students' opportunity to study when and where they wish. Flexibility then becomes the student's degree of independence of the time-space dimension. This understanding of setting may be relevant as a basis for a broad description of flexibility, but in relation to concrete analytical work it may also be useful to clarify further what characterises students' links with their setting.

Accordingly, it is important to note that time and space do not exist as independent dimensions but must be understood as consisting of objects, physical or social (Sayer, 1992). The student's freedom to study when and where he/she wishes must therefore also include freedom in relation to what constitutes time and space, whether it be other actors, physical surroundings or other objects. On this basis, flexibility becomes the phenomenon's ability to sustain itself, in the face of changes in time, locality, material structure and/or social relations. A student's flexibility can thus be determined on the basis of how far he/she is dependent on being in particular places at given times, for example in relation to lectures and group sessions. Further, the student's flexibility is determined by the necessity of having certain physical objects to hand, such as computers, software, books etc. Finally, the student's flexibility is determined on the basis of his/her dependence on relations to other important actors and institutions, such as family, job, friends and so on. On the basis of the foregoing discussion, there are two particular aspects of the setting that appear important in understanding students' flexibility.

Firstly, flexibility does not necessarily mean that students are independent of setting but rather that they are independent of one particular setting. A number of studies reach the conclusion that the student's individual environment, such as family and workplace, is absolutely critical to whether or not a student is successful in a flexible course programme (Folkman, 2002; Home, 1998; Kember, 1999; Støkken, 1998, 2000). Grepperud et al (2004b) show for example in their own studies that students in flexible education choose this type of education because they have strong links to their home and/or family situation. One of the characteristics of distributed education that distinguishes this kind of education from the conventional kind is that the student does not have to meet at regular times on campus. The educational institution in turn does not lay down strict rules about where study is to take place. Nevertheless, students may still be highly dependent on being in a particular place for their studies but then on account of their ties to job, home and family. Grepperud et al (2004a) point out in this connection that flexible students' setting is primarily expressed in terms of work, home and leisure time. They also show, on the basis of their empirical studies, how this setting influences the student's opportunity to study. From the students' perspective, therefore, the peculiar characteristic of flexible studies is not that they can

study anywhere they wish but that they can study in a different setting from that dictated by conventional education. Students' flexibility can therefore be seen as the opportunity for a *re-connection* to, rather than a *disconnection* from, their setting.

Secondly, it is usually a question of *partial* flexibility that varies in relation to the different dimensions of the flexibility. The phenomena of time, space and physical objects and social phenomena cannot be separated from each other but are always interrelated to a greater or lesser extent. A computer, for example, always has a special localisation and meaning depending on its relation to social phenomena (Lægran, 2002). The distinctive character of a particular course can mean, for example, that the student has a high degree of freedom in relation to space and social phenomena but at the same time greater dependence on physical objects and time. In principle, therefore, a course of study can be followed anywhere in the world, at home, in a holiday cabin or on a beach in Majorca. At the same time, the course requirements may demand that assignments be delivered by e-mail to the study location. This means that a course which basically imposes no conditions in relation to place but on the other hand requires the use of computers for the purpose of communicating with the educational institution, limits the student's freedom in relation to where he/she can study. Students following netbased courses must at least sometimes be present in locations where computers with internet connections are available.

This can be illustrated by the fact that most flexible students, who from the educational institution's point of view have relatively great freedom to choose where they prefer to study, in practice elect to study at home (Gunnar Grepperud et al., 2004b; Kember, 1999). The explanation here may be that students depend on being able to combine their studies with other activities. Most students in this type of education programme have both established employment relations and an established family situation. The course is thus flexible in regard to space but the student's life situation means that the pursuit of study depends on his/her obligations in relation to job, family etc.

The key features of the student's everyday environment are therefore decisive for the student's flexibility. The student's ability to operate in different settings is therefore not uniquely a result of what characterises the student's association with the educational institution, but also of the characteristics of his/her everyday context. Students in the field of distributed education often depend for example on being able to renegotiate their roles in everyday life in order to uphold their role as student. (Støkken, 1996).

Flexible students and a changing society

I have so far identified some basic characteristics of flexibility by taking as my point of departure the relationship between students and educational institution on the one hand and students' ties to their everyday setting on the other. At the same time, distributed education clearly does not exist in a social vacuum. A deeper understanding of the way students relate to the educational institution and their everyday setting must therefore be viewed in the light of general processes that go towards shaping this type of education and thereby student's student life. In what follows, I shall therefore place distributed education in a societal context, with the aim of showing the driving forces behind this type of education and thereby also the background to students' flexibility.

Interests outside the course programme

In the first place, distributed education can be seen as a project initiated mainly by actors with interests outside the student him-/herself, often with underlying financial motives on the part of authorities and employers. A key element here is then the development of the economic basis for society, with consequent new requirements in relation to employees' education. It may be argued that new, flexible forms of production call for flexible workers ready to adapt to changes in production (Harvey, 1989). This can be seen as a response to changing production conditions in the form of global competition, the deregulation of production factors and the state of the labour market (Edwards, 1997). It is further assumed that continuing education lays the foundation for an adaptable workforce. In order to bring about continuing education of the workforce, employers, with the support of the authorities, have adopted measures such as distributed education. Lifelong learning has thus become an important factor in economic development (Edwards, 1997). This kind of approach to the relationship between social change and distributed education focuses on the fact that changes in the workforce are essential to the continuing existence of the capitalistic system of production.

The preceding analysis reflects power relations in which it is those who control production who have the resources and decide the rules. Flexibility thus means freedom for the enterprise or public service, not for the worker. This can be illustrated by the suggestion put forward by Moland and Gautun (2002) to the effect that part-time employment in the health-and-care sector can be regarded as a "compulsory" working situation for employees in the interest of creating flexibility for the employer. In the same way, Bakke (2001) raises the question as to how far it is a benefit or a burden for women when they resort to using a PC as a means of combining a job with care of children. This underlines Nylehn's (1997) point that stability on one level can contribute to flexibility in the form of change on another level. In this case, change will be expressed as the *need for workers to be flexible*. From the workers' point of view, therefore, flexibility and change imply a situation characterised by coercion.

In the same way, flexible course programmes can also be seen as something the student is forced to choose so as to be able to keep pace in a tight labour market: coercion rooted in the need of industry and public institutions to sustain their activities in the face of changing conditions and circumstances. The employees provide the organisation with its flexible qualities by adapting so that the organisation can continue its activities. The focus is therefore on economic development and not on the student's personal needs.

From this point of view, it may be legitimate to ask how far the *freedom* to study at home or at work is as much an *obligation* to add studying to all the other tasks to be done. This can be illustrated through Støkken's (1996) comment that the distance learning student often has to sit at home and complete assignments instead of visiting friends or taking part in other social activities. The survey made by Grepperud et al (2004b) of the flexible student shows clearly how education is pursued at the cost of the student's "free" time. This perspective may be particularly relevant to many women's life situations (Handy, 1985).

The coercive aspect becomes even clearer if we include technology. Webster (1996:42) claims that technology's link to economic development is used *"to re-establish social control and discipline, and to create a submissive and flexible worker"*. There are many examples to show that technology contains powerful determining factors linked to the aim of controlling the workforce (Rosen & Barodi, 1992).

The same may be said of educational technology in relation to students. New technology provides the educational institution with new ways of ”disciplining” distributed students by tying them “closer” to the institution. This can be done by expecting students to be ”online” at given times and assignments to be regularly submitted by e-mail. If the idea is that new technology should replace physical meetings, this may also reduce the student’s freedom to organise his/her daily life at will (Støkken, 1996). At the same time, this is not, as Edwards (1997) also claims, a necessary result of incorporating the use of technology. He also raises questions about how far this is a dominant function of technology.

Students’ interests in focus

Distributed education can also be seen as a project driven by students’ needs and wishes. The intention is to give the student the opportunity to follow education as part of his/her basic rights. Education is thus a social benefit which the student needs and to which he/she is entitled, independent of the employer’s needs and wishes. Distributed education can then be seen as a learning project aimed at giving the student an opportunity for personal development. At the same time, education can also be regarded as instrumental, as a contribution to the student’s economic and social mobility. Taking this kind of approach to education, it is the educational institution, or the workplace, which is required to be flexible in the sense that it must adapt to the student’s needs. Ideally, the student should be able to maintain approximately the same life situation while also following education. Once more we see the applicability of Nylehn’s (1997) argument, that flexibility on one level can contribute to flexibility on another.

It is accordingly the student’s life situation that predominantly setss the basic premises for how education should be designed. The course programme must therefore either be tailored to certain groups of students or be flexible in the sense that it is possible to study in a variety of settings. A flexible course programme accordingly provides such freedom in relation to time, space and other contextual factors (Støkken, 1996). It is exactly this that Grepperud et al (2005:16) are calling for when on the basis of their empirical surveys of flexible students’ study situations they conclude that *”less standardisation, more contextualisation”* is a primary challenge for higher education. As I have earlier touched on, this freedom often means in practice the possibility to uphold the student’s life situation. The idea that in principle one can study anywhere will therefore also imply the freedom not to make radical changes to one’s life situation (Kember, 1999). In that case it may be asserted that students *have flexibility* in the sense of having freedom to form their own lives. The student’s ability to determine his/her own life situation, however, depends on having the necessary resources and power to obtain support for his/her needs and wishes. This presents a challenge in relation to marginalised groups of students (Duran, 2001; Perraton, 2000a).

A final factor in relation to the student’s freedom to study wherever he/she wishes, as I have already touched on, is the use of different kinds of communication technology. Students can, in theory at least, keep in touch with students living far from established educational institutions with the help of modern communication technology (Bruce, 1996; Nylehn, 1996). The problem here is that these groups are also often economically marginalised and thus have limited access to advanced technology. This applies especially to many students in developing countries. In this way, a type of education basically thought of as including will because of the Internet be excluding because of the strong dictates of such technology (Nylehn, 1996).

Dimensions of students' flexibility

Rasmusen (2005:14) raises the question: *"When is part-time work a benefit that gives the employee the desired flexibility to be available for the family or other personal activities, and when is it an imposition that gives the enterprise flexibility?"* In this article I have chosen a similar point of departure in looking at what it means to be a distributed student. The discussion so far shows that students' flexibility can involve qualities that give an opportunity for both change and stability as well as freedom and coercion. In sum, these form different dimensions of students' flexibility (see Table 1).

	Change	*Stability*
Freedom (have flexibility)	Students' possibility to re-organise their daily routine as they wish, without over-regulation from the educational institution.	Students' possibility to sustain important relations in everyday life, for example relations to friends, family and work.
Coercion (must be flexible)	Requirements and expectations for the student to change his/her daily routine so that he/she can study.	Requirements from expectations that the course programme will be completed at the same time as other obligations continue to be respected, for example in relation to job and family.

Table 1: *Dimensions of students' flexibility*

These are the dimensions showing different aspects of students' flexibility, and not necessarily particular types of education programme or study situation. There is therefore no contradiction either between the different categories of flexibility revealed in the meeting/interface between the different dimensions of this flexibility. For example, there is no obvious contradiction between the requirements that the course of study should be completed at the same time as everyday obligations are met and re-organised as wished.

The possibilities, requirements and expectations indicated in the table are in reference to the structural relations entered into by the student. As indicated in the previous section, these can be represented by the student's links to the educational institution, family and workplace. At the same time, these structural relations can also, as shown in this section, be represented by more general societal structures such as changes in employment and welfare policy. The main point is that such structural principles are both enabling and inhibiting in relation to students' options and hence also their flexibility.

Technology and flexibility

In the preceding section it was pointed out that technology is important in determining how students are linked to educational institutions. In this section, I shall discuss this in greater detail and look more closely at how technology functions in relation to students' flexibility.

Knowledge, technology and flexibility

Modern institutionalised education depends on the capacity to conserve and mediate bodies of learning. The art of printing has therefore been critical technology for the development of formal education. The capacity to conserve and store knowledge has made it possible for learning to be applied by others even though the individual person has neither had direct experience of it nor had it communicated face-to-face. In what Giddens (1991) calls traditional

societies, cooperation through face-to-face interaction was the most common form of integration and is referred to as *social integration*. Cooperation through mediated learning comes under what Giddens refers to as *expert integration*. The use of technology for the mediation and communication of learning gives room for specialisation by means of the fact that individual persons can acquire abstract knowledge in a particular field without having had direct experience of it. Knowledge is thereby isolated from its original setting and students have access to abstracted learning through books and other media. In many ways, this creates the basis for the existence of the educational institution. Books have therefore become an essential form of technology in education. But other forms of technology too, such as radio, TV, calculators and later the computer, have periodically, and to a varying extent, had a profound influence on the education system (Cuban, 1986; 2001). *Mediation* is therefore a key factor in education (Säljö, 2000).

Given the fact that, by and large, learning can be isolated from time and place through the use of various storage media, why then are most courses of study held on a campus? I shall not attempt to answer this question in depth, but would like to touch on a few factors that are central to our understanding of students' flexibility. One basic feature of education is, as previously discussed, the student's formal association with an educational institution. As part of this association, it is expected that the student will get help in converting the knowledge "stored" in the book to personal learning. Conventionally, this has taken place through face-to-face meetings between students and lecturers or course directors. Technologies such as pen and paper, board and chalk, overhead projectors, slides and so on have been key aids in these meetings (Cuban, 1986). Even though stored knowledge in theory is relatively independent of time and place, access to it has been seen as dependent on a given social practice situated in time and space. The book's original flexibility is thereby reduced through the learning process being tied to formal education and hence also to physical meetings between student and teacher in given locations, usually a campus.

In distributed education, however, these face-to-face meetings have largely been eliminated and replaced with the help of communication technologies such as letters and telephone, radio, video and more recently the Internet (Armstrong, 2002). These technologies play a decisive role in determining students' links to the educational institution and are hence a determinant for the phenomenon of distributed education itself. Technology is therefore basic to the connection between educational institution and students by virtue of being both a communication technology and a storage medium. Traditionally, these dimensions of technology have been separated into different technologies (for example between books and the postal system), but with the advent of the new information and communication technology (ICT) the media have partly merged together in technologies such as the Internet (Castells, 1996).

In order to obtain a better picture of how technology affects flexibility for students in distributed education, I shall now discuss this, taking ICT, exemplified by the Internet, as the starting point. However, the discussion will apply in essence to all types of technology. The aim is to identify structural properties of the technology that are critical to the student's flexibility. I shall take as my basis the previous discussion of flexibility linked to the discussion by Hanseth et al (1996) and by Hanseth and Monterio (1997) of the relationship between standardisation and flexibility in information infrastructures. I shall begin by looking at the notions of change flexibility and user flexibility[2].

Change flexibility

Change flexibility indicates the ability of technologies and systems to adapt to changed conditions. This type of flexibility says something about the structural characteristics of the technology itself and how these characteristics are connected to, and interact with, the context of the technology. The flexibility of the Internet is thus characterised by its constant adaptation to new user groups, new distribution and so on. In keeping with most types of technology used in distributed education, the Internet for example was not originally envisaged in the role of educational technology (Nylehn, 1996), but has now, in addition to the book, obtained a position as one of the most important technologies in distributed education. This flexibility is thus characterised by change, but at the same time in the form of adjustments that mean that the substantial aspects of the Internet are maintained. The Internet's ability to survive and develop, including as part of educational technology, will therefore require continuous change (Hanseth et al., 1996; Smarr & Catlett, 1992). In this argument there lies implicitly the idea that the ability to meet change depends on the existence of a stable component. Hanseth et al (1996) link this stable component to *standardisation,* which may be interpreted to mean that technology's internal connections are structural properties. Standards are fixed norms for how information systems and information structures should be designed. They can thereby be seen as part of technology's integral structural properties (Hanseth & Monterio, 1997; Hanseth et al., 1996). The purpose of standards is to enable systems to operate in different conditions with different users, and they are thus a prerequisite for flexibility.

From the perspective of change flexibility, flexible education technology implies technology and systems that can be adapted to the learning situations of individual students. For example, a "learning management system" (LMS), often used in distributed education for managing students' learning situations, must be capable of change so as to meet students' needs in particular situations. The change potential may be an integral aspect of the application itself, for example by allowing students and teachers to develop the interface as appropriate, or through system developers who adapt and develop the system in response to new needs as they arise. But even a system like LMS requires a certain standardisation, for example in the form of applications which can be used no matter which browser students use. A relatively standardised interface recognizable to the student will also make the system more user-friendly. At the same time, a standardised interface may seem inhibiting in relation to the function a system is intended to serve in a particular course programme. A flexible learning technology will accordingly have to strike a balance between change potential and standardised solutions. It will therefore be interesting to see what Web 2.0 and new user-directed functions will mean for alternative fora for education, since these web solutions are largely dynamic and open to change by the user. This leads us to the next form of flexibility.

User flexibility

The second form of flexibility, *user flexibility*, is based on users' freedom to make use of the technology in different ways. It is thus an expression of structural links between technology and user. User flexibility can be understood through the notion of s*cript,* as it is developed in Actor Network Theory (Akrich, 1992). Script refers to how artefacts have built-in patterns for use. Although these patterns may contain wishes, visions, notions and physical limitations, they are in no way determinative for use. Script is therefore the contact between those who have designed the technology and the users. This does not mean a linear process in which thoughts and ideas are passively communicated from developer to user (Law, 1992). Nor is it a process in which different actors have their *programmes* in which they try to realise their visions. Programmes are the actors' *attempt* to gain support so that they get

acceptance for their scripts (Latour, 1987). The result of an inscription will be a result of how it is translated and given meaning by the different actors, and is described in Actor Network Theory through the term *translation* (Callon, 1991; Latour, 1987).

Related terms in socio-constructionist approaches to technology are *cultivation* and *domestication*. They focus on how technology is adapted and given meaning in people's everyday lives (Lie & Sørensen, 1996; Silverstone & Hirsch, 1992). Here it is not the development of technology that is interesting but rather how different actors construe technology and hence give it its characteristics. The main point is that the properties of the technology in themselves do not determine its use.

The consequence of the argument above is that even though inscriptions and structural properties contribute to deciding the technology's flexibility, the "translation process" must also be considered. How the users perceive, interpret and relate to technology is thus determinative for the technology's flexible properties.

Educational technology used in distributed education will also have these integral scripts in which different actors have visions, objectives and purposes in relation to how the student applies the technologies in question. The actors may be system developers, teachers, administrators and technical service personnel in the educational institution. All of these have more or less concurrent programmes in which they seek acceptance for the design and use of the technology. Once again, we can use LMS as an example. A "complete" LMS has a long process behind it, in which all the actors mentioned have played a greater or lesser part. The result is various constraints built into the LMS, for example in the form of access rights, links to the administrative system, functionality and directions for student use. Stringent procedural rules give students limited possibilities and lay down strict directions for use. For example, students may have limited access to incorporating their own material, while at the same time the teacher may require them to submit a given number of contributions to the discussion forum. By means of electronic logs, the teacher can monitor the student's use of the system and sanction accordingly. Weaker constraints on the other hand will leave it very much up to the students and teachers to determine their use of LMS. For example, students may be free to form their own group rooms and use the discussion forum when they want to and for their own purposes, without being subject to control by teachers.

A final interesting element concerning the relationship between technology and flexibility is to assume that a particular type of technology used in an open and flexible study programme is itself a script. This applies to all types of technology, everything from books to the Internet, but its relative strength will vary in relation to the type of technology in question and students' access to this technology (Rumble, 2001). In Norway, where there is dense Internet cover, the requirement to use the Internet will normally be a relatively weak script. In a country like Indonesia, with an almost total absence of home PCs with Internet connection and where the most common point of connection is an Internet café, inscription will be substantially stronger. The strength of a script is therefore not a given dimension but must be seen in context. The final result for how the educational technology will be used will therefore, together with the script, depend on how students interpret, evaluate and give the technology meaning, with a starting point in the resource-related situation. In other words, how the users translate, cultivate and domesticate the technology on the basis of given resources. The user flexibility of the educational technology must therefore be understood both through the technology's inscriptions and how the user manages, perceives and interprets the inscriptions and the technology.

The use of the Internet as a standard and an inscription in a study programme will therefore not necessarily work in favour of flexibility. Its use may equally prove inhibiting for that matter. The result of this standardisation and inscription will also depend on the context in which the study programme operates. The Internet can thus be regarded as flexible technology in Norway while it may be less flexible in given situations in a country like Indonesia. From the foregoing argumentation, this means that the flexibility of the technology is not a given objective dimension but is dependent on contextual dimensions and how these interact.

Technology, actor and structure

The view of technology that appears from the foregoing argumentation is in many ways a contrast to more structure-focused perspectives, represented for example by Nylehn (1996). The basic premise can nevertheless be said to be identical, namely that technology is seen as value-bearing but without given results. The differences lie in the fact that both actor network theory and socio-constructionist approaches assign different actors, both as creators and users of technology, a more central position in relation to how technology arises and is applied. Nylehn (1996:207) asserts on the other hand that, for example: "*The students and their teachers! – are dominated and controlled by the technology they are using and they can only do what somebody else has built into it. The technology 'belongs' to others – it is not 'theirs'".*

A weakness of Nylehn's basic argument is that students become a *"victim"* of educational technology and are limited in how far they can adapt it to their personal life situation. With a view to flexibility, this will mean that it is "always" the students who must adapt to the technology and its developers. In many situations, this will certainly be largely correct. However, there are also many good examples from ANT (Bijker & Law, 1992) and socio-constructionist theories showing that users of technology are also active creators of technology by giving it meaning and content.

Summarising discussion: consequences for research and development work

In this article, I have argued the case that students' flexibility involves much more than their opportunity to study where and when they wish. Students' flexibility can on the one hand mean the opportunity to shape their own life situation, whether it means sustaining or changing relations in everyday life without too many constraints imposed on them by the educational institution. On the other hand, flexibility may also imply requirements and expectations in relation to organisation of employment and/or family situation and how other commitments in everyday life continue to be met. Students' possibilities, requirements and expectations in relation to the organisation of their everyday life, and thereby their flexibility, are determined by the students' ties both to the educational institution and to principal actors in everyday life. A key feature of distributed education is therefore that students, with the help of communication technology used by the educational institution, no longer have to commit themselves to regular attendance on campus and can thereby follow the study programme in their normal everyday setting. Nevertheless, this technology may carry built-in constraints that limit the student's freedom to act in their everyday environment. Technology can herefore both strengthen and weaken the possibilities, requirements and expectations that the student encounters. In addition to the properties of the technology itself, the consequences of using it will be decided by the student's personal characteristics, the educational institution and the student's everyday life. This view of students' flexibility can be summarised as in Figure 2.

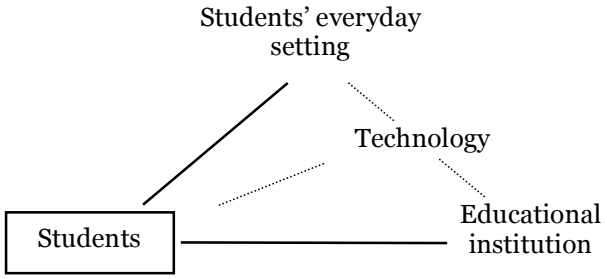

Figure 1: Analytical model for studies of students' flexibility

A key point of this approach is that any evaluations and analyses of students' flexibility, in addition to students' options must also take into consideration the factors that enable and inhibit these options. On a basic level, therefore, flexibility concerns how the meeting between actors and structure affects students' change and is sustained in practice on an everyday level.

If we take this approach to an understanding of students' flexibility, what are the consequences for research and development in the field of distributed education? In the first place, intentions to design study programmes allowing students to choose where and when they wish to study are at best based on a simplified notion of flexibility. In the opposite case, it may lead to the overlooking of important factors that play a role in forming the student's student life. Even when the educational institution sets few rules and constraints, students following distributed education will always, to a greater or lesser extent, be dependent on their everyday environment for a successful outcome of their studies. This underlines the need to learn more about the student's daily life and how this functions in conjunction with the rules and constraints imposed by the educational institution (Gunnar Grepperud et al., 2004b; G. Grepperud et al., 2005). In this way, factors serving to strengthen or weaken students' capacity to pursue this kind of course may be identified.

The use of technology, from the foregoing perspective, must not be considered exclusively as a dimension in the relations between the student and the educational institution. Acquiring better awareness of how technology works in distributed education means that the student's everyday setting must be included in our analysis. The way in which the technology is integrated in these personal environments determines how the properties of the technology function in relation to the student's study situation.

We also need knowledge of how different aspects of students' everyday contexts are interconnected. What is required is therefore empirical research into material factors, for example how computers affect students' opportunities and limitations in choosing different locations for study purposes. Similarly, we also need knowledge of how the student's family and job situation affect the student's scope to allocate time and space for study.

In the practical development of distributed education account must also be taken of students' everyday setting, whether family or job situation, in designing the study programme. It may be useful, for example, to adapt the teaching programme, including the use of technology, to students' everyday life and context in practice. Not all forms of technology are advantageous to students. In many situations, it may be helpful, for example, to avoid the use of new, advanced technology, in order to enable students to change their life situation while maintaining their basic relations. In this practical development work, we must be aware that the degree of flexibility does not necessarily increase even when the system lays down few rules about the student's physical location, if simultaneously there are strict requirements regarding the

use of technology. System standardisation must therefore be weighed against the need to adapt the technology to the individual course or the needs of the individual student. A form of technology such as the Internet, for example, may work in a flexible way for certain students but give little flexibility for others, in the worst case prove an excluding factor.

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[1] The abbreviation for *Sentralorganet for fjernundervisning* which later changed its name to *Sentralorganet for fleksibel utdanning*, but kept the same abbreviation. In 2003 SOFF merged with Norway Opening Universities (*Norgesuniversitetet*) and now goes under that name. The body was originally established as an advisory body for the Ministry of Church Affairs and Education. It has also awarded development funding for flexible education.

[2] The terms change flexibility and user flexibility are based on the division of the flexibility concept by Hanseth and Monterio (1996) into *flexibility in change* and *flexibility in use*.