<table>
<thead>
<tr>
<th>Description</th>
<th>Link/Download</th>
</tr>
</thead>
<tbody>
<tr>
<td>New types of learner, new forms of learning</td>
<td>Overview</td>
</tr>
<tr>
<td></td>
<td>Using this website</td>
</tr>
<tr>
<td></td>
<td>elearning glossary</td>
</tr>
<tr>
<td>What does elearning offer?</td>
<td>elearning myths - hype and promise</td>
</tr>
<tr>
<td></td>
<td>Technology viewpoints</td>
</tr>
<tr>
<td></td>
<td>Learning in the future - scenario building</td>
</tr>
<tr>
<td>New types of learner</td>
<td>Networked children</td>
</tr>
<tr>
<td></td>
<td>Learning from ‘cradle to grave’</td>
</tr>
<tr>
<td></td>
<td>The lifelong learning market</td>
</tr>
<tr>
<td></td>
<td>Continuing Professional Development</td>
</tr>
<tr>
<td>Changes in learning</td>
<td>Just-in-time, just-in-case and just-for-you learning</td>
</tr>
<tr>
<td></td>
<td>The technology of personalisation</td>
</tr>
<tr>
<td></td>
<td>Mass personalisation: the shape of things to come?</td>
</tr>
<tr>
<td></td>
<td>Death of the course? Continuous updating</td>
</tr>
<tr>
<td></td>
<td>Online learning and constructivism</td>
</tr>
</tbody>
</table>
It is easy to be caught up with the hype about elearning (or online learning, or networked learning) and view this as a golden opportunity to offer different types of learning opportunity to suit different types of learner. Or you may be more inclined to a cynical view about the potential of these new technologies when weighed against the costs (financial and human) involved in changing an established system of higher education to accommodate unproved new methods and questionable pedagogies.

This selection of learning objects introduces a variety of topics relating to the opportunities for new types of learning, particularly the scope for personalisation and customisation and new types of learners, the digital ‘natives’ and the ‘silver surfers’. Several of the objects encourage you to question your own views and understanding, for example to question some of the hype and identify some of the myths, or to consider scenarios for the future of learning. Some of these ideas may be unfamiliar to you, some scenarios appealing, others appalling.

Feel free to select the learning objects which most interest you. Most include at least one activity which will encourage you to explore the topic in more depth or test some of the principles expounded. Many offer further reading or links to external websites to support wider investigation.

I have grouped the topics within this part of the course into four ‘collections’:

- introduction
- what does elearning offer, now and in the future
- new types of learner, from childhood to continuing professional development
- changes in learning, from mass personalisation, through personalisation and customisation to just-in-time, just-in-case, ‘just-for-you’ learning.

Feel free to sample from amongst these or browse through them all. They are intended to complement the collection provided in elearning 2: New environments for teaching and learning.
This part of the course is available online as a series of digital 'learning objects'. In arranging the content in this way, so that each short section can be accessed separately and (largely) independently, we hope to encourage flexible use of the material. You may be interested and currently involved in addressing some of the issues raised here, for example the potential of personalisation and customisation. You may wish to broaden your awareness of the impact of elearning in general, or investigate one aspect of this contentious subject in particular. You may have experience of teaching or learning online yourself, or this course may be your first experience of 'elearning'.

We hope that you will find what you need by browsing the sections of the website that interest them, picking and choosing amongst the topics here.

As emphasised in the overview for this part of the course the website is intended to be a flexible resource to suit your requirements. You are not required to read all the pages, or to follow a set sequence in your reading. How much or how little you use or refer to this material is a matter of personal preference or interest. This flexible approach to use is also supported in the other online sections of Pack 5.
You may be unfamiliar with some of the terms used in writing about eLearning. Some of these terms are highly technical and others are acronyms describing technologies or bodies connected with online education or the wider Internet.

This short activity introduces you to four different online glossaries that provide valuable aids whenever you encounter a term you are unfamiliar with during the course. There is considerable overlap between the coverage of these glossaries.

**Activity: Introducing some glossaries**

1. Spend a short time exploring each of these four glossaries:
   - Learning Circuits glossary (provided by the online magazine Learning Circuits)
   - JISC glossary of acronyms; hosted by the JISC (Joint Information Systems committee)
   - The CETIS encyclopedia; maintained by CETIS (the Centre for Educational Technology Interoperability Standards.
   - The glossary on the LTSN (Learning and Teaching Subject Network) Generic Centre site. This includes a wide range of words and acronyms used in education, including eLearning terms.

2. Use these four glossaries to find definitions of the following terms: PDA (personal digital assistant), videoconferencing, metadata and IMs.

3. Bookmark the glossary or glossaries that you prefer. This will make reference easier whenever you are online.

4. If you have used or generated bespoke glossaries for particular courses or subjects before, how satisfactory do you find the use of online glossaries here?

5. Would you consider use of online glossaries to support your own teaching?
As with any new area, there is much written around e-learning. There are, for instance, claims that it represents the future of education and will change the nature of universities, or that it will lead to the depersonalisation of educators. In this activity you will explore some of these commonly proposed views and find examples of their proponents.

The following claims have been made about online learning:

1. It is cheaper than traditional methods of education or training.
2. It achieves lower quality education and understanding than conventional modes of teaching.
3. It is necessarily based around discussion and dialogue.
4. It will lead to a drastic reshaping of current educational systems and establishments.
5. It removes the educator from the process.
6. It is best suited to training rather than education.
7. It is only suitable for some topics.
8. It will lead to the commercialisation of all education.
10. It increases the responsibility of the individual for their own learning.

Activity (alternative 1)

The first activity is to perform a simplified version of a cluster analysis. This involves clustering concepts together according to a number of personally selected criteria. So, firstly you should group the above claims together according to ones that you feel are similar in some way. Then edit your original choices so that you end up with five separate clusters. Any claim may appear in more than one group, but you should ensure that all of the claims appear in at least one group. A group can consist of a single claim. The next step is to analyse the reasons for those groupings in order to reveal your own underlying views. So, for example, I might group claims 1 and 2 together. My reasoning for this is that both views are, I feel, based on an information transfer model of online learning.

Your solution to this activity should take the form of a completed version of the following table:

<table>
<thead>
<tr>
<th>Cluster</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>Put the number of the claims you have grouped together in here</td>
<td>Give the reason for your grouping here</td>
</tr>
<tr>
<td>Put the next set of claims you have grouped together here</td>
<td></td>
</tr>
<tr>
<td>and so on...</td>
<td></td>
</tr>
</tbody>
</table>

So, my table with the first row completed would look like this:

<table>
<thead>
<tr>
<th>Cluster</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) 2)</td>
<td>Based on an information transfer model of online learning</td>
</tr>
</tbody>
</table>

Look at your reasons. Do they reveal anything about your own views of online learning? You might like to share them with other members of your tutor group, or compare them with my clusters and reasons (which should not be interpreted as a correct answer in any sense, merely my personal views). There will undoubtedly be differences. Can you account for why these have occurred? For instance they might be the result of different backgrounds, or underlying philosophies, or merely varying interpretations of the claims above.

Activity (alternative 2)
Select one claim from the list above, and explore it in more depth:

1. Expand upon the claim, giving a brief explanation of why the claim is made
2. Find a proponent of the claim, in an online article, journal article or book, giving full references and explaining with quotations how they can be seen as a proponent of the claim, or
3. Talk through the selected claim with three of your colleagues, determining what their views are.
4. Rehearse a counter-argument to the claim, giving the opposing viewpoint. This can be from your own perspective, or by using references and quotations.

References

You may find the following a useful starting point for the activity:

*Delivering Learning on the Net.* Kogan Page, Chapter 2.
**Background**

The way people react to the internet is often influenced by an underlying view of that technology (or indeed all technology). Some perceive the internet as a threat, to their status, career, values they hold dear or aspects of society in general. Even if these underlying beliefs are not articulated or even acknowledged they will inform the type of activity such a person views the internet as being suited for. For example, if someone’s underlying assumption was that the net is a detrimental force in society they might think of it as essentially a distribution medium for pornography. Conversely, others may see the internet as a revolutionary force that empowers individuals by allowing the free exchange of information.

Such viewpoints might be termed dystopian and utopian respectively. Technological utopias and dystopias are frequently found in science fiction, where the author, wishing to make a comment on current society, envisages a future society where technology has either freed or enslaved human beings (for dramatic purposes, the latter is usually preferable). However, examples of such views are not only to be found in science fiction. Educational technology literature over the past 20 years shows the promises and fears that have been associated with a variety of technologies including computers, CD-ROM, computer assisted learning, artificial intelligence, virtual reality, videodisc, etc. The internet is just the latest in this list.

What both the positive and negative viewpoints have in common is that they see the technology itself as shaping human behaviour. The term for this is 'technological determinism', a phrase first coined by Thorstein Veblen, and elaborated upon by Marshall McLuhan. The technological deterministic viewpoint is that technology is an autonomous system that affects all other areas of society. Thus human behaviour is, to a greater or lesser extent, shaped by technology.

The contrary view is called 'social determinism' which, put simply, claims that society is the controlling factor. Thus society shapes how individuals behave and also how technology is used within that society.

This grid combines these two continuums:

![Diagram of Dystopian and Utopian Continua](image)

<table>
<thead>
<tr>
<th>Dystopian</th>
<th>Social Determinism</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technological Determinism</td>
<td>Utopian</td>
</tr>
</tbody>
</table>

**Activity: ‘Determining’ your own position**

In this activity you will be determining your own beliefs regarding technology. Firstly, read at least two of the following readings to gain a deeper understanding of the concepts. Each presents a particular view of technological and social determinism.

**Technological determinism**


Chandler, D. - *Technological or media determinism*

Noble, D. (1997-2001) *Digital Diploma Mills* (There are several articles under this collective heading. There is no need to read all of them, one will suffice, although you may like to read them all.)

Now place your own personal view of the Internet on the grid above. Justify your positioning by providing examples of how you view the Net and the sort of stories regarding it that interest you.
Further reading

If you are interested in reading further the following articles and chapters may help you to further understand your own position.


Spender, D (1998) - Building up or dumbing down, A Keynote Address to the Communities Networking/Networking Communities Conference.

Predicting the future is a decidedly risky business. Yet that is what we are asking you to do now for your own organisation or another organisation of your choice, perhaps The Open University or the UKeUniversity.

We would like you to draw upon some rather extreme scenarios of future learning that have been devised by Gilly Salmon and refine your own future scenario. You will then be asked to consider this 'brave new future' from the viewpoints of various organisational stakeholders to better understand who this might serve and what could motivate opposition.

What is the value of trying to predict an uncertain future in such a limited activity? Quoting Theodore Levitt, 'The future doesn’t descend upon us on some prophetic day like the Messiah ... It grows out of forces which are now turbulently in motion ... Whatever warning we’re going to get we already have'. Here is an invitation to consider some general and specific warnings!

Activity 1: What kind of future?

Gilly Salmon’s paper ‘Future Learning Encounters’ presents four separate visions for the future of online learning as alternative scenarios. To make the divisions between these options seem more stark she describes them as different planets and suggests what learning might be like on Planets of Contenteous, Instantia, Nomadict and Cafélattia. She also offers a number of links to initiatives which she feels, to some degree, resemble the environments set out in her scenarios.

In the first part of this activity you are asked to choose the scenario (planet) which you would feel offers the greatest potential for taking online learning forward in the organisation that you have chosen. Write a short future scenario of your own based on what you know about the organisation that you have chosen and making explicit what has motivated your choice. This should be a concise overview, in line with the scenarios provided, and offer suggestions of applications of the particular style of learning within your chosen organisation.

Salmon’s planets are drawn up as extremes, so feel free to remove or alter those elements that would not be helpful (provided they are not integral to the culture of that planet). You can also add refinements of your own. If your future organisational planet is significantly different from Salmon’s then you may wish to give it a new title or even harness two planets together to provide an alternative universe.

Activity 2: Whose kind of future?

Even though you have just created a new world, it is unlikely you are entirely happy with your new planet. In particular you may be apprehensive that the inhabitants (who are all drawn from your organisation) may not wholly approve of their future on this planet.

Drawing on the new scenario that you have created consider what the response would be from the following organisational planet inhabitants:

- trainers or teachers
- accountants
- other senior management
- operational managers
- IT and other support staff
- workers/students
- other stakeholders.

For each group suggest whether they would be likely to be in favour or not, what the new scenario would offer for them, and what threats it may pose.

When you have this list consider whether there are any assurances or adjustments that you can offer to the planet to encourage 'buy-in' from all groups. If not, what will this mean to the future of the planet?
It has been suggested that people aged under 28, i.e. those whose entire adult life has post-dated the creation of the world wide web are internet 'natives', familiar with email, websites and mobile computing while older users are 'immigrants' facing a more pronounced learning curve when using the internet and adopting further changes in technology.

If we compare the formal schooling that 'natives' and 'immigrants' received and the role of computing, there is likely to be a marked difference in the presence and role of ICT and the internet. Tomorrow's workforce - children in school and pre-school today - are subject to an even greater exposure to technology in terms of both breadth (types of technology used and subjects taught using technology) and depth (time spent using the technology and assessment systems which incorporate or reward its use). These same learners are also more likely to draw on the internet for informal learning or other purposes from researching soap stars and pop idols to deciding which university to apply to. They may be contributing their own information and communications online (textual, visual or auditory) by participating in chatrooms or more formal discussions, or by publishing their own website of weblogs.

If we speculate about the expectations that today's children will bring to education, particularly post-compulsory education, we might expect the following.

1. The next generation of students will have a high level of skill in using computers and the internet in their daily lives. For some of these, computers will have been used since their earliest school, or even pre-school learning experiences.
2. These students will expect to use computers and the internet for their studies, whether directed to do so or not. In particular, they may use various communications technologies to work with or learn from their peers or experts beyond the teaching environment.
3. Students will have high expectations of the application of connected technologies informed by familiarity with commercial packages such as games and use of bulletin boards, discussion groups and free sites for a range of purposes.
4. Learners will have improved access to personal, probably mobile ICT to support their studies.

In combination, these expectations suggest that future educational provision for these 'connected children' will need to reflect and meet the requirements of a better-informed and more demanding ICT-literate market. This will present a challenge to organizations within which the educators and trainers are internet 'immigrants' and may be unenthusiastic or ill-informed about the potential of networked learning and the internet.

"Digital natives" ... have developed new cognitive habits and thinking patterns that are very different from those of the "Digital Immigrants" who came before, and they require very different types of learning. A big part of our current education problems stem directly from the fact that the Digital Immigrants - who comprise most of our teachers and trainers - are not very fluent in the language the Digital Natives speak. In fact, they generally have a Digital Immigrant "accent" that is hard for the natives to understand. This "Digital Immigrant Accent" includes going slowly, going step-by-step, using outlines for organization, reading manuals, going to the internet second rather than first, and especially the "tell-test" approach to teaching. The Digital Natives find this accent and approach very hard to deal with. After all, these are the "hypertext" people who taught themselves computers with no formal instruction at all! (Marc Prensky, 2001).

Before starting the activity you may like to read the report Young People and ICT 2002. This is a recent report commissioned by the UK's Department for Education and Skills. During your reading note any trends in the use of ICT by young people and by institutions using ICT with younger learners.

Activity

1. Choose a discipline or skill area with which you are familiar and briefly consider, for each of the following age groups, what use formal education or training makes of the internet and ICT. (These classifications are based on the UK education system, if you wish to use different classifications or age ranges then please do so.)
   - pre-school (up to age 5)
   - primary education (ages 5-10)
   - secondary education (ages 11-15)
   - further and higher education (ages 16-24)
2. Choose the age range which you feel is currently most advanced in its use of the internet in addressing your chosen subject/skill
area. Using the internet as a source, search for further examples of internet/ICT use. Try to build a picture of how advanced the most advanced application of connected learning within this subject is and what use may be like in ten years time.

3. Finally, using the internet, research non-educational online use of this age group. You should aim to find 2-3 facts or statistics about their current use of the internet, for example use of chatrooms, websites targeted at this age group, ownership of connected technologies.

4. Reflect on what you have found about formal educational or training provision for your chosen group within your selected subject/skill area. To what extent is there a gap between the expectation of internet 'natives' and the provision offered by the 'immigrant' professionals?

References

Becta (2003)
Young People's use of ICT
http://www.becta.org.uk/research/reports/youngpeopleict/index.cfm

Marc Prensky (2001)
Exclusive interview with Marc Prensky
elearningpost, March 15, 2001
Lifelong learning can refer to learning beyond compulsory education, learning after retirement, or, at its most all-embracing, learning throughout life, literally from cradle to grave. The learner may be motivated by personal interest, by the need to acquire specific knowledge or vocational qualifications, to effect some change in their life or to better cope with a changing environment. They may be pursuing an academic or research career. Increasingly older learners (both formal and informal) may have retired early because of redundancy or ill health, or because of the need to care for others (ESRC, 2002).

Access to online environments, resources and networks of connected learners or experts is having a significant impact on the quality, quantity and sources of lifelong learning, both formal and informal. Examples of online study at every level are becoming less unusual, as a browse through the ICDL course database shows. Students following online courses may differ from those attending similar face-to-face taught courses in terms of background, motivation for study, financial circumstances and age. Others may already be studying, or have previously studied, in conventional educational or training environments. There is now increasing interest among educational institutions and professional bodies in supporting learners once they have graduated or left the campus. This may take the form of online continuing professional development or a virtual alumni network.

At the less formal end of the learning spectrum, a simple websearch on almost any leisure interest or vocational requirement shows the extensive learning opportunities available. Access to online resources and networks of like-minded individuals can help to sustain an area of research, improve practice or introduce new areas of interest. Hobby interests such as genealogy, which may previously have been solitary geographically-constrained pursuits, are particularly well-served by the potential to create and sustain special interest groups or global communities online.

The following activity requires you to choose a definition or category of lifelong learning and provide a review of how online learning is addressing the needs of these lifelong learners.

Activity

1. Provide a simple (single sentence) definition of lifelong learning and identify different categories of lifelong learner within that definition. For example a broad definition based on the cradle-to-grave view might include the following sub-sets:
   - antenatal, pre-school (ages 0-5) - aimed at the babies/children rather than parents or carers
   - school age (ages 6-16) - alternative education or additional formal education
   - further and higher education (16+) - alternative education or supplemental formal education
   - vocational education (16+) - for those in and out of employment and including continued professional development (CPD)
   - post-retirement (60+) - formal and informal learning focused on leisure
   - informal leisure-focused learning (any age)

2. Choose a group of learners who meet your criteria for inclusion in one of the categories you have created, e.g. young mothers planning a return to nursing after a 5-year career break, post-retirement couples studying higher level qualifications for pleasure. You will need to be realistic in considering how, where, when your learners could use the online resources that you have identified and any excluded learners among your group.

3. Use your skills in searching the internet and using online databases to find at least 10 online resources or references which address the requirement for, support or provision of, lifelong learning for this group.

4. Produce a short online report or review of provision, or prospectus for these learners. Incorporate links to up to 10 resources which you have selected as relevant to these learners.

References

Economic & Social Research Council (17 Dec 2002)  
Older People and Lifelong Learning: Choices and Experiences  
HERO ref: 15275
You will no doubt have heard a lot regarding 'lifelong learning' and the need, or trend, for everyone to be a learner throughout their life, in order to accommodate change, flexible working patterns, etc. Although there seems to be an intuitive appeal about the term - it seems to match what we feel is necessary given the rapid rate of change in modern society (both technologically and socially) - it is necessary to ask to what extent is lifelong learning a reality? Is there such a thing as a lifelong learning market? If so, what sort of products might be popular in this market? What size is the market? What are the demographics of the audience? What are the main issues for this audience?

Firstly, let us define lifelong learning. The European Union defines it as

all learning activity undertaken throughout life, with the aim of improving knowledge, skills and competence, within a personal, civic, social and/or employment-related perspective.

They go on to say that:

Lifelong learning is therefore about:

- acquiring and updating all kinds of abilities, interests, knowledge and qualifications from the pre-school years to post-retirement. It promotes the development of knowledge and competences that will enable each citizen to adapt to the knowledge-based society and actively participate in all spheres of social and economic life, taking more control of his or her future.

- valuing all forms of learning, including: formal learning, such as a degree course followed at university; non-formal learning, such as vocational skills acquired at the workplace; and informal learning, such as inter-generational learning, for example where parents learn to use ICT through their children, or learning how to play an instrument together with friends.

Learning opportunities should be available to all citizens on an ongoing basis. In practice this should mean that citizens each have individual learning pathways, suitable to their needs and interests at all stages of their lives. The content of learning, the way learning is accessed, and where it takes place may vary depending on the learner and their learning requirements.

Lifelong learning is also about providing "second chances" to update basic skills and also offering learning opportunities at more advanced levels. All this means that formal systems of provision need to become much more open and flexible, so that such opportunities can truly be tailored to the needs of the learner, or indeed the potential learner.

This seems a reasonable definition - it stresses that lifelong learning is about developing all kinds of skills and knowledge, not just those recognized formally. It also states the motivation for lifelong learning - so that citizens can adapt to a knowledge-based society and participate effectively within that society.

There seems to be a lot of activity, interest and investment surrounding lifelong learning. To what extent does it represent something new, or is it merely a convenient label for activities that people have always undertaken? That is what we will explore in this activity.

**Activity: Lifelong learning presentation**

In this activity you are going to compile an argument for lifelong learning as a new and substantial market. Imagine that you are making a presentation to a large institution (this could be a university or a large training organization) where you hope to impress upon them that lifelong learning represents a fundamental shift in the education and training market, which requires significant investment and new ways of working, but will reap good returns on investment.

1. As the first part of this activity you should find one fact, piece of information, statistic or piece of evidence that might be useful to someone making such a presentation. You can find this from the internet, newspapers, journals, reports, etc.
2. Prepare this fact, information or evidence as a Powerpoint slide or a one page handout.
3. Having completed this activity are you convinced that lifelong learning represents a fundamentally different market?
4. What do you think the single most important driving factor is behind lifelong learning, based on the information you have seen?
The notion of a 'job for life' is a concept from the last century, no longer appropriate for the twenty-first century. One prediction is that the average worker will have not just five jobs in a lifetime, but five different careers in a lifetime. Even if we recognise the usual exaggerated scare-mongering in such a prediction, it is increasingly apparent that the responsibility for training, re-training, updating and re-skilling will inevitably fall on the employee, not on the employer.

The effect of the information explosion on the professions has already resulted in regulatory measures to ensure professional updating at specified intervals: doctors, dentists, lawyers, accountants, teachers etc. are all required to pass regular courses or show evidence of continuing professional development.

Some employers will fund their employees in almost any kind of learning programme, as they realise that maintaining an enquiring mind matters more than any specific information acquired. Others insist on their employees following programmes that, in their view, contribute to the company's bottom line. Still others have passed most of the responsibility for learning - in terms of time and cost - to their employees.

What do these trends mean for course providers, trainers, and lifelong learners? The most obvious implication we can already identify: the need for flexible learning opportunities. This is one of the drivers for e-learning and the take-up of asynchronous interaction technologies; lifelong learners will inevitably be fitting their learning in and around many other demands on their time. It is also a driver for the interest in learning objects: the need for short learning opportunities, tailorable to different requirements and personalised to individual learners. Course providers need to offer learning opportunities that can be quickly adapted to different markets, that can be re-sized, customised or updated, and that can produced or perhaps assembled in response to changing demands. The emphasis in most e-learning programmes on a student-centred pedagogy is also in keeping with the passing of responsibility for the general 'health' of one's learning on to the employee. Finally, the increasing focus of many online opportunities is much more on the processes of learning rather than on the content. So for example, online activities develop skills in communication, working in teams, finding and evaluating information resources, storing, accessing and handling large amounts of data, working with new technologies, updating and refining existing skills and knowledge.

**Activity**

Develop a plan for an imaginary friend (who could be yourself!) which involves a career change. Investigate the available courses, resources, qualifications of the new career and write out a learning plan that would underpin a career move. Spend about one and a half hours searching for the details and about half an hour writing it up. You might want to make reference to the training opportunities in your own organisation. You might also consider informal learning opportunities.

The purpose of this exercise is twofold:

1. to become acquainted with web resources on lifelong learning opportunities and to evaluate them for effectiveness and appropriateness
2. to consider seriously the implications of employee responsibility, career changes and lifelong learning.

If you indulge in a little day-dreaming or have fun planning someone else's life, that is an added bonus :-) For example, you could consider a career change from Accountant to Manager of an Eco-tourism company, or University Lecturer to CEO of a small e-training company.

http://students.open.ac.uk/desktop/h850-05k/files/elearn1.zip/H850cpd.htm
by Chris Pegler

Just-in-time (JIT) manufacturing became widely popular in the 1980s as a cost-saving efficiency measure which also had far-reaching implications for the relationship between supplier and customer. By keeping up-to-date information, maintaining good communications and improving manufacturing efficiency it was found to be possible to keep a very small inventory - just enough - and place orders with suppliers which would then be manufactured and arrive at the factory just-in-time. The ideal was to have components from a variety of manufacturers arrive at the factory assembly line just in time for production to start. They would not be stockpiled, or held for any length of time, at either the suppliers or the users, but manufactured from scratch each time they were needed, to meet the precise requirements of the moment. Although the unit cost of each component might be higher, the belief was that by eliminating waste the overall costs of the operation were significantly improved.

The JIT concept as applied to education has some elements of the manufacturing model, but also some important differences. Comparing the two:

- JIT education happens when it is needed and therefore waste, in the form of surplus stockholding (courses run at under-capacity) or lost opportunities (lack of training places at the right time on the right courses for the right people) would appear to be less likely to occur.

- The user (learner) draws down the product (learning opportunity) to suit their needs and timetable. They (theoretically) do not need to buy in advance just in case they need this later.

- The product (learning) may be created ‘on-the-fly,’ not existing before it is asked for, and tailored to some extent to the user’s requirement in terms of volume and specification. It has sometimes been described as ‘just-for-you’ as well as just-in-time.

- The producer is arguably less product-focused (creating courses and then seeking bookings for them) and more market-focused (delivering what is wanted)

- The provision of JIT education assumes that the training department or educational institution will have the products available at short notice.

With efficiency gains being largely unrealised, what is the main appeal of the JIT approach in training and education?

The appeal of just-in-time learning

In essence the appeal of just-in-time is that this recognises a change in the pattern of our working lives. We not only need to acquire more skills, for example ICT skills, than would have been necessary to do similar jobs in the past, we also need to update skills more frequently as the turnover in the technologies that we use escalates and as we change jobs within what have become more varied careers. The increase in employment of outsourced workers, in portfolio careers (where more than one job may be held at the same time), as well as the popularity of project-based work activities, all add up to a greater variety of skills and switching between job roles at short notice.

At the same time as the demand for us to learn more increases, there is commonly a reduction in the time available to learn more in formal situations. In international organisations and multinational companies the logistical difficulties involved in providing training opportunities to far-flung employees may be an almost insurmountable barrier to meeting training needs in a timely fashion.

All these factors increase the individual’s learning requirements while making them more complex and individual, less predictable and more time- and place-dependent. The just-in-time approach appears to offer a solution and, just as with manufacturing, it is an approach that can only work effectively where it makes use of the newest technology.

Typically just-in-time also means that the training or learning is delivered at the desk (or rather on the desktop) of the employee and often within their usual working environment. This has tended to dictate a pattern of devising activities that take only a small amount of time to complete and can be entered or exited frequently so that they can be studied alongside the normal work of the employee. This suits a design which uses learning objects in a relatively granular fashion, for example as Barclays Corporate University (BU) does with learning nudges of two minutes each.

Most importantly it recognises that what most people want is ‘just enough’ information or knowledge at the right time rather than spending time acquiring knowledge on a ‘just-in-case’ basis. Their fear is that they will either waste time in the classroom or have forgotten the information that they need by the time that they need it. Just-in-time learning is highly contextualised and should therefore be highly memorable.

The downside of just-in-time learning

However, there are some clear difficulties, or at least several potential problems, with the just-in-time approach. For example there may be very real difficulties in finding somewhere suitable to study in the normal work environment. For some employees their work may not include routine access to a computer and they may not therefore have the skills to use it within a learning resources environment. As Michael Barratt
Just-in-time, just-in-case and just-for-you learning

(Lecturer in eBusiness at the Judge Institute of Management) points out 'Some of our researches indicate that making both the time and the space is critical, a key problem for a number of employees is finding even an appropriate place to do it. Being at their desks is distracting, managers pull you into meetings, people walk by, the phone rings, if you’re a customer service rep etc. What do you do? Do you put a flag up on your desk to say that “I’m in learning space now?” (Barratt, 2002)

For anyone using just-in-time and relying upon this approach for all their learning at work there are additional dangers that it may be easy to ignore the presence of the learning opportunity until it is 'just-too-late' to do them any good. They may have little opportunity to test their understanding before using the skill and it could become a crutch to mask a lack of deeper understanding. The disaggregation of the learning experiences may also mean that it is difficult to make the necessary connections between the different learning incidences, to ‘join up the dots’ and see the larger picture.

It should also be remembered that the organisation frequently learns something about the training needs of its employees through traditional training or educational delivery experiences and this may be lost through just-in-time e-learning, particularly if this is carried out by a variety of external providers. Will ranks of test scores compensate for richer face-to-face feedback? If not then the training function may, over time, become more remote from the real training needs of the organisation.

Activity: A taste of just-in-time

During this activity you will have the opportunity to try some just-in-time training approaches for yourself.

1. Go to the [BU 'Take the Lead' site](http://students.open.ac.uk/desktop/h850-05k/files/elearn1.zip/H850jit.htm). Unless you are a Barclays employee you cannot access the whole site, but the learning nudges (two minute long learning objects) can be viewed by selecting the Learning Modules option and then selecting All Nudges within that. (When you first log on you will need to identify where you are logging in from (home user) and what grade (other).) This site gives you access to online training which has been devised for use within Barclays to help develop leadership skills. Try at least two of the ‘learning nudges’ for yourself. Consider what the strengths and weaknesses of this approach are and compare them with the commentary above.

2. If you have access to Powerpoint or Word, or similar software devise a simple presentation or handout which identifies what you consider the most important advantages and disadvantages of the just-in-time approach to learning from three points of view: your own, that of another identified employee, and their employer. State which perspective you are taking in each instance and try to limit yourself to the main points only and three slides in total.

3. Now use the Powerpoint or Word Help system as a just-in-time assistant to help you apply an animation or other effect to the presentation or handout that you have just devised. In Powerpoint do this by choosing the Microsoft Powerpoint Help option from the Help menu and type in what you want to do with your selected text or image. (Word and other packages have similar help systems).
   I typed in 'rotate text' and then chose 'animate a diagram or organization chart' and then by following the directions and choosing the options I ended up with [this example](http://students.open.ac.uk/desktop/h850-05k/files/elearn1.zip/H850jit.htm). You should try to do something here that you have never before attempted. Be bold.

4. These two just-in-time approaches take very different approaches to very different learning needs. For each of them draw up a list of strengths and weaknesses giving reasons for your conclusions.

5. Do you feel that a just-in-time approach would be suitable for some of your students, or some of your teaching? If so consider how you would make this available to your students.

6. In reflecting on this you may decide that you already offer some just-in-time support to your students. If so how does this work and what use does it make of technology?

Reference

Michael Barratt M, 2002
Observation during audio interview with Dr Soraya Ali of Cambridge Programme for Industry.
The technology of personalisation

by Martin Weller

Introduction

There is an increasing demand from users not only for web pages to be well designed and contain interesting content, but to provide information that is personal to them. This is in fact one of the great advantages of the Internet as a medium - it is personalisable. It is not a mass broadcast medium like television but rather a personal communication medium. This is one of the reasons why it has such an appeal for educators.

The first generation of web pages contained static, hyperlinked documents. The ease of publishing and the potential of hypertext to create non-linear documents was enough to make the web appealing and fuelled its massive uptake in both commercial sectors and among individuals. We are now moving to the second generation of web sites, where static content is no longer seen as sufficient. Content needs to be pertinent to the individual user. By collecting data about users and utilising the potential of large databases, websites can now provide dynamically created content. This means you will get information that should be relevant to you: for example, if you were visiting a site selling DVDs, the sort of films you have expressed a preference for will be shown on the main page.

In this activity you will look at the technologies required for personalisation.

Reading

You should read an interview conducted with Will Woods and Nick Meara at the Open University, where they explain the sort of technologies required for personalisation, some of the issues involved, and what the future might hold.

Read the interview now: Personalisation Technologies - Interview

Activity

In the interview a number of technologies have been highlighted in bold. Draw up a list of the technologies highlighted and by visiting Amazon (this link goes to Amazon.com the US site, but you may prefer to go to the one based in your own country), find examples of how each technology is used from the perspective of the user. It may be that you cannot find examples of some technologies, or that they are not apparent to you as a user.

Reflection

When you have done the above, answer the following questions:

1. Were there any technologies you could not find examples of? Why was this?
2. What is the most significant technology in your view?
3. Did you think the personalisation offered was valuable, or fine-grained enough?
4. What would you like to see in terms of a personalised site?
5. Are you wary of providing information to sites so that they can achieve personalisation?
The idea of mass personalisation (or mass customisation as it is more usually known (Pine, 1993)) is one which recognises that the inflexibilities of mass production may lack appeal in an age where there is increasing emphasis on the importance of diversity, individualism and personal style. Within e-commerce there have been several successful initiatives which, while harnessing the economies of scale associated with factory-based mass production, allow consumers to tailor the product they receive to their preferences by selecting between different options. Dell computers is probably the best known example (Mello, 2001).

This approach is not one which is usually applied to education, but it is an idea which is worth exploring as it exposes what may be the full disruptive potential of the internet for teaching and learning. Stephen Downes (2001) has written a short and thought-provoking 'take' on mass personalisation in education and we will look at some of the themes explored there. First of all we need to consider whether learners see a difference between customisation (which lets you specify your own preferences) and personaliation (which makes recommendations and other choices on your behalf without receiving any explicit instructions from you). Current research, for example Nunes and Kambil (2001), indicates that, perhaps because the technology is not yet living up to its promise, users commonly prefer customisation to personalisation. Confusingly the two sets of functionality are sometimes bundled together under the term 'personalisation'. You may feel that this is what Downes himself has done.

Activity

1. Read and make notes on the short discussion post by Downes to a discussion board. Stephen Downes, Personalized Education (2001). There are several associated links here which you may wish to explore.
2. In 'Making Mass Customization Work' Pine et al. (1993) suggest that to be successful mass customisation should be 'Instantaneous, Costless, Seamless, Frictionless'. Taking your own educational institution as an example, consider what the barriers would be to achieving each of these objectives. For each objective consider what it would take to overcome any barriers, and whether the barriers are short-term, long-term, or totally inflexible?
3. Downes suggests that mass personalisation will be adopted because the current class-focused model is wasteful. Given the barriers to change that you have identified, is this sufficient motivation? What other motives may there be for a move in this direction? Consider how you would respond to Downes if you had been part of this online discussion.

References

Nunes P and Kambil A (2001)
Personalization? No Thanks,

Pine II, B J (1993)
Mass Customization - The New Frontier in Business Competition,

'Making mass customization work' Harvard Business Review,
September-October, pp 108-119. Harvard Business Review articles can be accessed through the OU Library using EBSCOhost (Business Source Premier) and your ATHENS password.
Death of the course?

by Chris Pegler

If we consider what a course has traditionally meant - whether as a stage towards a qualification or a stand-alone offering - we can identify several elements which may not apply to newer 'courses' using teaching and learning online. For example the traditional face-to-face taught course will usually have:

- single start and finish date (although there may be multiple presentations of the same course within an academic or financial year)
- single syllabus (although teachers and learners may take different paths through the content there is generally an given sequence with agreed core and optional material)
- single version of the course for each presentation - the content will not change while the course is in use
- single set of students with minimal changes to the students during the course apart from changes accounted for by withdrawal, non-attendance, late registration or transfer
- single specification offered to all students of that course (although students with disability may be offered different formats)
- single assessment system applied to all learners (with provision for exceptional circumstances such as disability or excusal)
- registration and enrolment, possibility fee payment by the student before they can start the course
- certification by a single institution, that which also provides the teaching and supports the learning.

In your own institution courses may also have other features, but what the title of this learning object suggests is that a single comparatively static course, provided to but not directly influenced by students, may no longer be the course model of the future.

Online teaching and learning has already adopted alternatives to courses and changed the ways in which courses can be offered as suggested in this claim

'E-learning companies are churning out fewer structured, one-size-fits-all courses, creating in their place a fresh generation of educational events that run at the same speed and in the same direction as the unpredictable intellects of real adult learners' (Vicky Phillips, 2001).

Examples include:

- **Just-in-time learning which is available to the individual from the desktop**, delivered as small independent lessons (nudges, nuggets or bites) and for which there is no formal enrolment or registration process.

- **Communities of practice models** where learning may be delivered peer-to-peer in response to an individual learner's immediate requirement for information.

- **Continuing professional development or alumni networking** which takes place after the traditional course has ended and has no fixed start or end dates. Learners opt in or out of optional learning events.

- **Personalized or customized learning or 'mass personalization'** (Stephen Downes, 2001) where the precise specification of the course content is determined by the individual student or in response to his or her prior experience.

- **Flexible start and finish dates with rolling registration.**

- **Course content updated while the course is in presentation.** This may have previously happened in face-to-face teaching - with late breaking news incorporated into the lecture or tutorial of the day - but has previously been difficult or impossible for conventional open and distance learning courses.

However it must be realized that to change a course-based institution to one which offers more flexible approaches to content delivery will be difficult. The perceived impact of such a change on its infrastructure, the terms of employment of its staff, its relationship with other institutions and the form and availability of expensive buildings would influence any decisions. A wholesale change is unlikely to happen quickly in more traditional teaching institutions, although distance learning providers and organizations working with corporate partners may have more to gain. Overall you may feel that the course model could claim, like Mark Twain, that 'rumours of my death are greatly exaggerated'.

**Activity**

1. Choose a traditional face-to-face or offline distance-taught course with which you are familiar and identify the three biggest improvements that would result from presentation of this course online using a less rigid 'course' model (i.e. more flexibility in terms...
2. Next identify the three biggest barriers to presenting this course in this way.
3. Consider whether the revised course would appeal to the same learners as the conventional course? To different learners? To more learners?
4. Can you envisage the ‘death’ of this course within the next ten years? What single factor is most likely to speed or impede its demise?

References

Stephen Downes (November 2001)

Vicky Phillips (2001)
Visions: Death of the course
Virtual University Gazette, November
http://www.geteducated.com/vug/nov01/vug1101.htm
The idea that learning is a process of constructing knowledge rather than receiving it as fact or truth from books or experts, has come to be referred to as the constructivist theory of learning. The online environment, with its vast repository of both dubious information and pearls of wisdom, is an ideal space in which to test a constructivist approach. Furthermore, the opportunity to exchange ideas, express tentative thoughts, receive feedback and revise opinions makes a very powerful contribution to constructing one's own understanding. These two attributes of the online environment had considerable appeal to the early pioneers of e-learning, and there has been a tendency to associate constructivism with online learning ever since. However, the early adopters are different in many ways from those who followed after them. The aim of this exercise is to explore how accurate and how appropriate this ‘association’ is.

**Activity: Exploring manifestos for online learning**

Here are two different manifestos for online learning, one American by Boire, Hanson, Landis, Tsikalas and VanderVeen, entitled *Bridging the Disconnect: An e-Learning Manifesto* and the other British, entitled *Working Towards E-Quality in Networked E-Learning in Higher Education: A Manifesto Statement for Debate* by Beaty, E. et al.

Of course it is in the nature of a manifesto to be visionary rather than a reflection of reality. Nevertheless, consider how appropriate these manifestos are:

- for education
- for training
- for all types of online courses
- for all curriculum areas.

1. For what aspects of learning is constructivism most appropriate in your view? Are there types or areas of learning for which you consider it unsuitable?
2. How applicable would a constructivist approach be in your institution?
by Martin Weller

Below is my clustering and accompanying reasons for the e-learning myths, hype and promise exercise. As I have stated, there is no right or wrong answer to this, since your groupings will depend on your personal perspective and experience of the claims.

The claims were:

1. It is cheaper than traditional methods of education or training.
2. It achieves lower quality education and understanding than conventional modes of teaching
3. It is necessarily based around discussion and dialogue
4. It will lead to a drastic reshaping of current educational systems and establishments
5. It removes the educator from the process
6. It is best suited to training rather than education
7. It is only suitable for some topics
8. It will lead to the commercialisation of all education
9. It improves corporate performance
10. It increases the responsibility of the individual for their own learning

My solution

<table>
<thead>
<tr>
<th>Cluster</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) 2) 5)</td>
<td>These are all based on an information transfer model of online learning, i.e. that video or media without support is an effective model.</td>
</tr>
<tr>
<td>3) 10)</td>
<td>Particularly with constructivist pedagogies, there is an increase in dialogue and on student-centred approaches.</td>
</tr>
<tr>
<td>4) 8)</td>
<td>These both see online learning as having an impact beyond just as a means of delivering teaching, but affecting the context within which they occur also. One of the ways 4 may be realised is through 8.</td>
</tr>
<tr>
<td>6) 7)</td>
<td>Both limit the area of applicability for online learning. While some aspects of some topics need a face-to-face element, that is not to say that the whole of any one subject cannot be taught online.</td>
</tr>
<tr>
<td>9) 1) 3)</td>
<td>This depends on what is meant. If it improves performance because it is cheaper than face-to-face training, then claim 1 is applicable here. If it means that performance is improved because it emphasises communication between colleagues then 3 is applicable.</td>
</tr>
</tbody>
</table>
H850 The technology of personalisation

by Martin Weller

Based on an interview with Will Woods and Nick Meara of the Open University, by Martin Weller.

1) In what ways can a website be personalised, so that each user has a different experience?

The level of personalisation can vary enormously, from a site that simply knows your name so will have a personalised welcome message, to ones which provide a unique and rich experience for each user.

It is important to distinguish between personalisation and customisation. Personalisation is where the system performs certain actions, for example presenting you with specific information, based on what it knows about you as an individual. Customisation is where the user selects from a range of options, for example choosing to receive information based on their interests and preferences.

An obvious example of a site that provides both components is Amazon. The site is personalised so that when you return to it, it knows who you are and provides recommendations, interviews, features and so forth based on your previous purchases. It is also customisable in that as a user you can edit your favourites; so for example, the information you receive on the home page focuses on DVDs rather than books, you can refine your recommendations, subscribe to email updates and so forth.

Individual portals are also a good example of customisable websites, for example, by signing up with one of the portal sites such as My Yahoo, MyNetscape or MyLycos users can select the information they receive, for example focusing on sports, stocks and shares, local weather, etc. They also have access to tools such as an individual calendar, email and instant messaging.

Another way the system can personalise the information you receive is by assigning different roles. For example, within an organization you can create roles according to the department a person is in and their grade. So a manager in personnel will receive some similar and some different information from a staff developer in the same department. This will have a different set of similarities and variations from a manager in the sales department. The system can also track where you have visited in the site and alter the information you receive based on this, for example if you frequently visit the company documents archive, this might be placed in a prominent position on the home page, or you may be notified about new documents.

Another way of customising a site is to allow users to alter the design of the site by selecting from a range of design 'skins' or templates. For example, the web logging site Blogger.com allows users to select from a range of templates for their 'blogs'. Similarly, the portal sites mentioned above, such as MyYahoo, allow users to select from different themes.

2) What technologies are important in personalisation and customisation?

The most important things is that the site needs to know who the user is. Therefore you need some process of registration and authentication. The more a system knows about you then the greater the level of personalisation it can provide.

Once you have registered, some systems use 'Cookies' to allow easy access. This means you don't have to sign in each time you revisit the site, in order for it to know who you are. Cookies are small text files stored on your hard disk that maintain state information between the web browser (client) and the web server. So, for example, Amazon might store a cookie on your machine that says who you are. When you visit the Amazon site, the system finds this cookie, so that it can load your personal preferences.

There are limitations to the amount of information that can be stored in a cookie and there are serious problems with security. Because of the way they are implemented they can be easily accessed by hackers, or just other users of the computer. This means that you only want to hold relatively low-level information in cookies, for example someone's name and preferences. Sensitive information, for example credit card details, would not be stored in cookies. For any such information you need an authentication procedure. This is a check on the person's identity, usually involving a challenge-response procedure, e.g. asking for a unique identifier and password.

Any authentication procedure will usually be done through a secure socket, that is a connection that uses encryption to encode the data being passed between the user and the system, so that it is difficult (although not theoretically impossible) to be hacked into. Depending on the sort of interaction that occurs in a site, it may be that only the authentication procedure is encrypted, and the remaining interactions are left as normal, or, for sensitive interactions, for example a checkout procedure in an online purchase, the whole of the interaction remains encrypted.

For any personalisation and customisation, you require a database on the server that stores information about the users, their preferences, settings and so on. In this database you need to have sets of rules that inform the system what to do with a given set of information; for example, if a user is senior management, then post a link to the minutes of the management committee on their home page. Commonly used databases include Oracle, Microsoft SQL and MY SQL.

Data warehousing, that is the gathering and storing of vast quantities of data from online interactions, and data mining, which is the analysis of this data to reveal related content is also useful. Obvious examples of these are the recommendations found in sites such as Amazon. Much of this is automated, creating links between products and personalising the users interface accordingly. Autonomy is an example of a company that sells server software to enable this. Another interesting development is the use of collaborative filtering.
Initially this was developed by companies like Firefly (who have since been bought up by Microsoft). The idea was that you could get people to register their interests, likes and dislikes. If someone else logs in, and they seem to match the tastes of a previous subset of people, then they can receive information pertinent to their tastes, for example recommendations, special offers, etc. One of the difficulties with this approach is that it is difficult to get a large enough group of people to enter sufficient amounts of data. So, what companies such as Amazon do is they infer tastes from certain actions. For example, if you purchase several books, then they assume you like these and build up a database of related items. This is not always the case, for example some of your purchases may be gifts for other people, so do not reflect your tastes, but such anomalies are insignificant given a large enough set of users. Similarly, by logging which pages people look at news and magazine sites like the NYTimes or BBC can suggest other stories you may be interested in.

The increasing use of XML is a means of enabling personalisation, since it stores content in a database that can be easily searched (through the use of appropriate metadata) and presented in different formats (because the style of a document is separated from the content). However, XML is not essential for personalisation - a system that can dynamically present information is what is required, and XML is one way of achieving this.

3) What are the drawbacks of these technologies?

A big drawback is expense - the sort of databases required to achieve personalisation are usually large and complex. They are expensive to install and maintain, requiring a specialist team to do so.

Privacy is also a very important issue. As soon as you start collecting personal data (which is essential in order to do any personalisation) then you need to comply with the Data Protection Act that addresses issues such as who has permission to view this data, and what are legitimate uses of the data. This now extends not just to databases of personal records, but also to any reference to an individual contained in emails.

Related to this are issues of security. You need to take appropriate steps to ensure that the data is properly secured. There have been a number of stories about companies accidentally exposing people's credit card details online.

People are very suspicious about other people holding their information, and the holder of that information is in a position of power. For example, when Microsoft announced its Hailstorm technology, the idea was that all of your personal data, such as credit card details, address, etc. would be stored centrally with Microsoft. Companies would then sign up with the technology, and you could move freely between their sites. This would remove the need for different passwords, and for each site to retain your information. It sounds beneficial, but many people were uneasy about the control and power this gave to Microsoft (see for example Scott Rosenberg's article in Salon - 'Microsoft Storm Warning'). The technology has been developed as their .Net Passport, but this is now open source, so the code is available to everyone, with Microsoft in a less central position.

4) How might personalisation be used effectively in learning?

The use of metadata to mark up content, for example specifying the pedagogy, content or learning style of a learning object could allow students to create a course that is suited to their own learning preference, or based on their needs. So if students come into a course with varying levels of expertise in different areas they can have more content on the topics they are unfamiliar with, while having minimal coverage of areas they may already be familiar with. Similarly, if a student has a more visual learning style, then they may have a course that contains a higher degree of visual elements, whereas another student may have more text-based content.

Many of the virtual learning environments, such as Blackboard, allow students to personalise their log-in page in a similar way to that of the portals mentioned previously. So students will automatically have information relevant to their course on their home page (personalisation) but can also opt in to other services, for example discussion areas related to their interest (customisation).

5) What do you think the future direction of personalisation will be?

It will become more commonplace. There seems to be a growing feeling that static content is no longer enough. In order to make people return to sites content needs to be updated regularly and be focused on the individual's interests. By building up increasingly detailed profiles of users a site creates a dependency and ties that user in, because other sites will not have the same level of information, and therefore cannot offer the same level of personalisation.

Personalisation will also become smarter, and operate with a finer granularity. This is partly a result of increased use of data-mining techniques as well as intelligent agents. It also arises through increasing the range of options for users. For example, instead of offering a range of twenty different design templates, sites will offer tens of thousands, and allow users to build up their online presence through the use of various tools.

Another way personalisation is being embedded in everyday use of the web is through the use of software code, or API, from the large developers. For example, you can incorporate the Ask Jeeves search engine within your own site. One step further is to modify the toolbar of your browser, for example both Google and Yahoo allow you to add their own specific toolbars to your browser toolbar.