

**A work in progress literature survey on mobile learning and podcasts in education
IMPALA Project**

by

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Oct 2006

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1 Introduction

1.1 Aim & objectives

- To investigate the use of podcasting and its current and potential use
- To give an overview of the existing literature
- The theory behind podcasting
- Why audio can be beneficial in an e-learning context

1.2 Research Questions

How does students' learning supported by Podcasting differ from their learning through structured campus or e-learning processes?

Does Podcasting assist with student motivation?

Is their learning more flexible, easier or successful?

How do you want to find out the differences?

Qualitative – Interview, questionnaire – student evaluation

Quantitative – pre-test, post test / last year/this year comparison

Six Leadership Functions of the Pownell-Bailey Model of Handheld Computing Literacy

- **Organising and Planning:** *Can mp3-Player help students better organise and plan their workload and time?*
- **Reference Information:** *What podcasts do the students download to their mp3-player?*
- **Gathering and Analysing:** *What tools do students use to gather and analyse information?*
- **Learning and Self-Improvement:** *Does the mp3-player provide opportunities to students for self-improvement and continued learning outside the class?*
- **Communication:** *What types of communication do students use ... social versus educational communication?*
- **Teaming and Collaborating.** *Does the use of the mp3-player promote teamwork and collaboration?*
- **Technology Integration and Transfer:** *Are skills from mp3-player transferable to the desktop and vice versa?*

Reference:

Franklin, T., Sexton, C., Lu, Z & Ma H. (2004) *College is in my Hand: Using PDAs in Teacher Education*, SITE 2004, pp. 2166 - 2168

Other measures:

Retention rates

Student performance

What kinds of pedagogical applications can be developed for Podcasting through MP3 players for students' informal use within formal HE modules that work to enhance their learning?

Have all the courses at the different partner institutions the same setup? Or is there a variety?

Content of the podcast:

formal – Audio lecture

Relevant information in form of interviews, dialogues, discussion

Informal – additional information

Is there an optimum number of podcasts per semester?/Is there an optimum length?

Can students switch from using MP3 players for entertaining to learning?

Where do students listen to podcasts? - Favourite location

How do students listen to podcast?

Do they listen to it once? Do they repeat sections?

What are the psychological, social and institutional barriers to and advantages of more informal learning using Podcasting?

Teacher evaluation

Overall Research Questions:

Is there a gender bias?

1.3 Methodology

Key words

- Audio's educational advantage
- Emotional aspects that contribute to learning
- Studies on other mobile technologies
- Pedagogical potential
- Support of learning activities
- Specific needs
- Cognitive abilities of diverse learners
- Situated and authentic learning experience
- Personalised learning experience
- Personal nature of learning through mobile devices
- Large scale mobile learning environment
- Large scale projects

Number of papers published in which journals, books or conferences

Short Key Words

Podcasting

Audio education

Radio education

Mobile Learning

Key disciplines

- Engineering
- Physical geography
- Human geography
- English Language & communication
- Sociology
- Genetics
- Vet science

1.4 Definition of mobile learning

Definition in respect of the learner

- Anywhere – location independent
- Anytime – time independent

Definition in respect of the learning

- Situated/authentic
- Fieldwork/workplace

Definition in respect of the technical device and the portability

- Mp3-player, phone, PDA, laptop, computer

M-Learning Devices

1. Mobile Phones, WAP Phones, 3Gphones
2. Tablet PC's
3. Personal Digital Assistants (PDAs)
4. E-book Readers
5. Hybrid Devices

Reference:

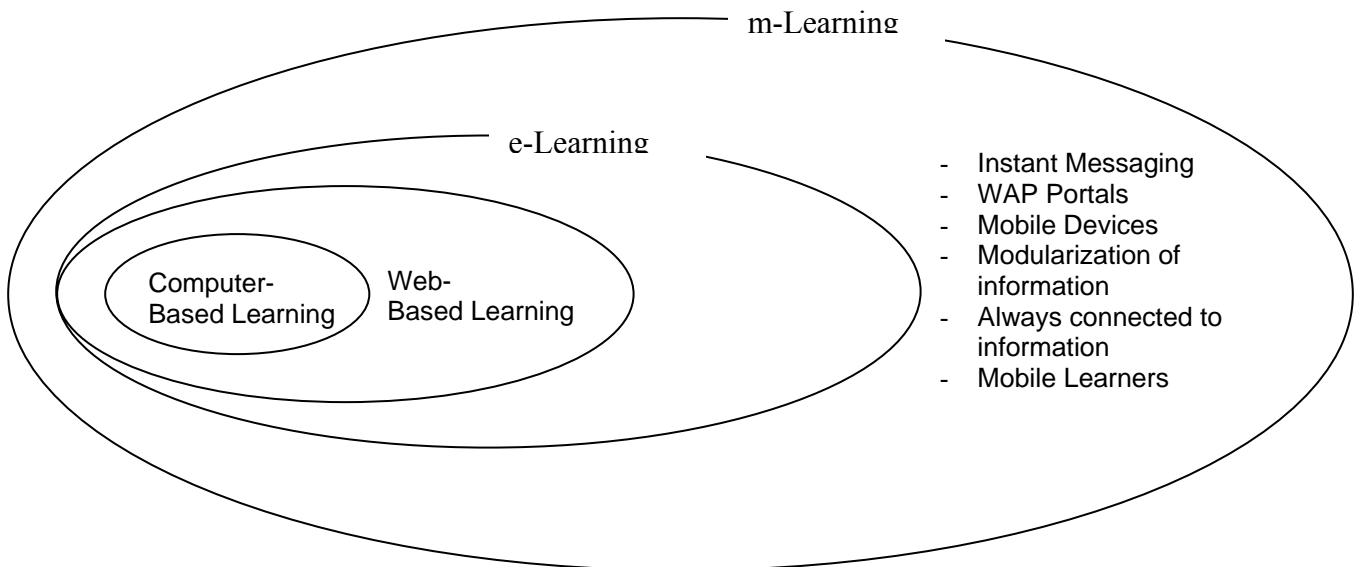
Chi-Yin Yuen, S. & Wang, S. (200) *M-Learning: Mobility in Learning*, ELEARN, pp. 2248-2252

First consideration for defining m-learning: New devices

Second consideration for defining m-learning: Previous research/projects

- Activity theory
- Adult informal learning theories
- Course developments

Third consideration for defining m-learning: Relationship with e-learning and other concepts of learning



New Definition of m-learning

“An extension of e-learning providing smaller learning objects in mobile handheld devices to mobile learners anytime and anywhere they need”

Reference:

Son, C., Lee, Y. and Park, S. (200) *Toward New Definition of M-Learning*, ELEARN, pp. 2137-2140

u-learning = e-learning + m-learning
ubiquitous learning environment

Main components of the existing Walkabout e-learning architecture are:

- Learning objects which contain the content of the learning modules, including text, graphics, audio/video or other media
- Learning exposition, the method used to explain the content
- Learning tasks students undertake to gain the understanding of the content, taking personal notes, completing exercises, quizzes or assignments
- Learning communications: the methods used for the necessary communication between students and teachers ...
- Administrative functions: the internet based applications needed to perform various administrative tasks

Reference:

Casey, D. (200) *u-learning = e-learning + m-learning*. ELEARN, pp.

Advantages of Mobile Learning

No other learning approach matches the integrated, continuous flow of m-learning [21]: **Seamless access to learning resources:** With mobile learning, you can learn and study anywhere - from the classroom to your desktop or laptop to your pocket. A true mobile learning system allows users to take a course on any device.

Freedom, power, and choice: M-learning students can choose where, when, and how they will study. The new range of options includes online synchronized, online self-paced, downloaded courseware, and computer-based training. M-learning offers new levels of freedom with the ability to exercise control over learning patterns.

Organized productivity: With only a cell phone, handheld device, PDA, or hybrid unit, users can access administrative functions, download courses, and review their learning history through a learning management system. M-learning offers an efficient way for learners to access key information and maximize their time.

Flexible, portable convenience: The ability to customize learning schedules is a key advantage m-learning. Learners are not restricted to a specific physical environment, a particular delivery channel, or a fixed set of times for undertaking training and education. Using the latest technology, students can update their knowledge base on a just-in-time basis to prepare for meetings or presentations.

Reference:

Upadhyay, N. (2006) *M-Learning - A New Paradigm in Education*. International Journal of Instructional Technology and Distance Learning, February 2006, Volume 3 Number 2

References:

Casey, D. (200) *u-learning = e-learning + m-learning*. ELEARN, pp.

Chi-Yin Yuen, S. & Wang, S. (200) *M-Learning: Mobility in Learning*, ELEARN, pp. 2248-2252

Son, C., Lee, Y. and Park, S. (200) *Toward New Definition of M-Learning*, ELEARN, pp. 2137-2140

Upadhyay, N. (2006) *M-Learning - A New Paradigm in Education*. International Journal of Instructional Technology and Distance Learning, February 2006, Volume 3 Number 2

1.5 Interpretation / categorisation of mobile learning

Mobile Learning is defined through mobility aspect in contrast to traditional face to face learning

E-Learning is defined through the electronic character of the learning in contrast to traditional face to face learning.

Technical realisation of mobile leaning through mobile devices

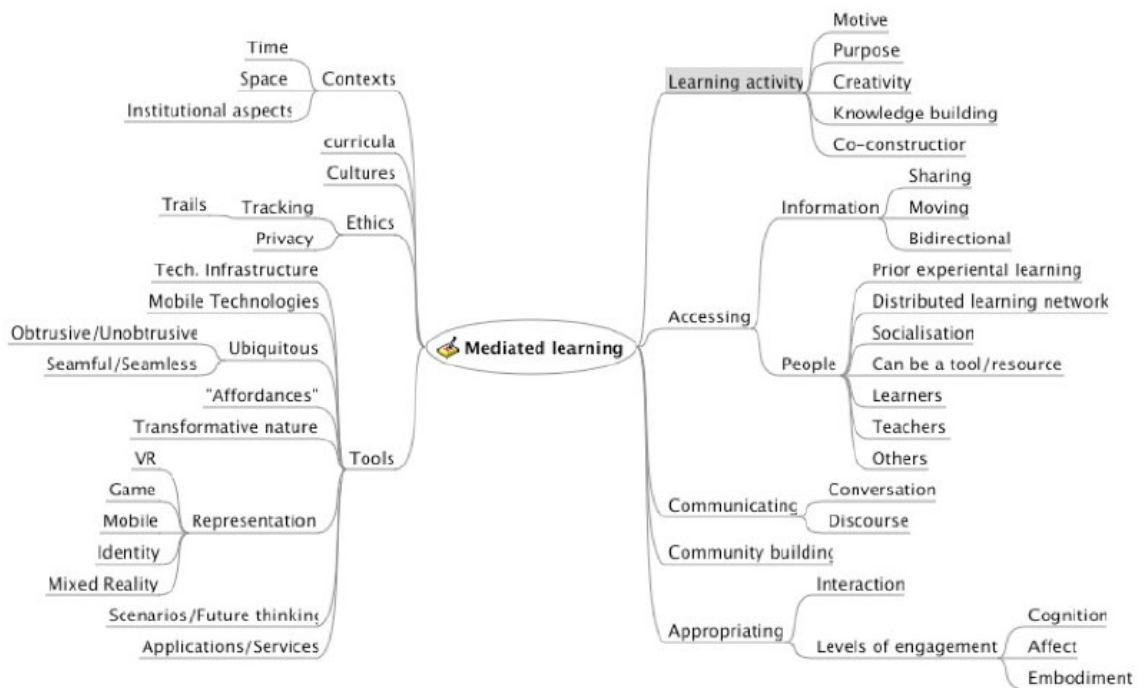
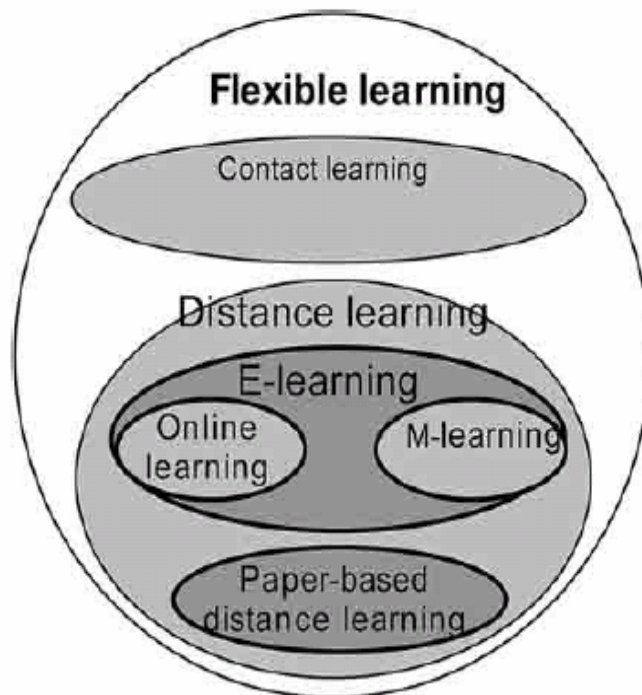


Figure 1: Mediated learning through mobile technologies (M² learning)

Reference:

Winters N., *What is mobile learning?* In Sharples, M. (eds) (2006) *Big Issues in Mobile Learning*. Report of a workshop by the Kaleidoscope Network of Excellence Mobile Learning Initiative



Reference:

Freysen, J (2004), *M-learning: an educational perspective*, mLearn 2004

“Just what is mobile learning (mLearning)? It’s elearning through mobile computational devices: Palms, Windows CE machines, even your digital cell phone.”

Reference

Quinn, C. (2000), *mLearning: Mobile, Wireless, In-Your-Pocket Learning*
<http://www.linezine.com/2.1/features/cqmmwiyp.htm>

Rainie, L. and Madden, M. (2005). *Podcasting. Data Memo*. Pew Internet & American Life Project

Syvänen, A and Nokelainen, P (2004). *Evaluation of the technical and pedagogical mobile usability*. In Proceedings of mLearn 2004, ,191 – 195

The following components of the technical usability criteria were specified (Nokelainen 2004):

1. accessibility
2. ‘learnability’ and memorability
3. user control
4. help
5. graphical layout
6. reliability
7. consistency
8. efficiency
9. memory load
10. errors

In addition, the following pedagogical usability components were specified (Nokelainen 2004):

1. learner control
2. learner activity
3. cooperative learning
4. goal orientation
5. applicability
6. effectiveness
7. motivation
8. valuation of previous knowledge
9. flexibility
10. feedback

The Components of Mobile Learning (CML) model was developed for evaluation of mobile learning. The model (Ahonen et al. 2002) consists of:

1. Continuity and adaptability
2. learning as a personal process
3. contextuality in learning
4. accessibility
5. support for time and learning management
6. flexible interaction

Reference:

Syvänen, A and Nokelainen, P (2004). *Evaluation of the technical and pedagogical mobile usability*. In Proceedings of mLearn 2004, ,191 – 195

References:

Brown (2004)

Freysen, J (2004), *M-learning: an educational perspective*, mLearn 2004

Rainie, L. and Madden, M. (2005). *Podcasting. Data Memo*. Pew Internet & American Life Project

Quinn, C. (2000), *mLearning: Mobile, Wireless, In-Your-Pocket Learning*
<http://www.linezine.com/2.1/features/cqmmwiyp.htm>

Shepherd (2001)

Syvänen, A and Nokelainen, P (2004). *Evaluation of the technical and pedagogical mobile usability*. In Proceedings of mLearn 2004, ,191 – 195

Winters N., *What is mobile learning?* In Sharples, M. (eds) (2006) *Big Issues in Mobile Learning*. Report of a workshop by the Kaleidoscope Network of Excellence Mobile Learning Initiative

1.6 Defining Mobile Learning Spaces

Stationary Learning situations are predictable – three classical learning spaces:

- Classroom
- Library
- At home

Reference:

Becking, D et al. (2004) *Didactic Profiling: Supporting the Mobile Learner*, ELEARN 2004, pp. 1760-1767

When and where students studied with mobile phones

- 39% - When I received mail
- 24% - Between classes
- 54% - When I'm waiting for my friend
- 6% - Before exam
- 31% - Home
- 16% - University
- 52% - During commute
- 4% - Restaurant

Reference:

Furuya C., Kimura, M. & Ohta, T. (200) *Mobile Language Learning – A Pilot Project on Language Style and Customization*, ELEARN , pp. 1876-1880

“A study by Vavoula (2005) of everyday adult learning for the MOBIlearn project, based on personal learning diaries, found that almost half (49%) of the reported learning episodes took place away from home or the learner’s own office, i.e. the learner’s usual environment. The learning occurred in the workplace outside the office (21%), outdoors (5%), in a friend’s house (2%), or at places of leisure (6%). Other locations reported (14%) included places of worship, the doctor’s surgery, cafes, hobby stores, and cars. There was no consistent relation between the topic of learning and the location of learning. An example of a connection between location and learning was a person learning the names of different kinds of foreign beer in a pub while conversing with friends. An example of no connection was a person discussing with a colleague over coffee at a bar and discovering references related to their work. “

Reference

Sharples M., Taylor J. and Vavoula G. (2006) *A Theory of Learning for the Mobile Age* .(pre-print)

Profiling Mobile Learning

- Situation – complex of environmental and intentional constraints
 - Frequency of interference – describes the frequency of interferences during a learning session, e.g. when sitting near the door in a café.
 - Scheduling/estimation of the available time – often the amount of time for learning in mobile context is limited and can be estimated.
 - Equipment at disposal – Which tools or aids are at the learner’s disposal in the mobile learning setting?

- Restriction of action and expression – refers to the context-dependent scope or restrictions to read, write, listen or speak with consequences for the provision and support of suitable learning processes and channels.
- Learner
 - Level of concentration/distractions – the learner’s self evaluated ability to keep concentration in spite of environmental interferences.
 - Previous knowledge with regard to the subject of learning – the learner’s level of knowledge and understanding acquired before starting a new learning unit.
 - Previous knowledge with regard to the technology – the learner’s level of knowledge regarding the use and handling of the mobile device and the learning management system.
- Learning Objects
 - Instructions Goals – in the context of mobile learning
 - Learning content – Which learning content shall and can be accessible to the learner, provided in which amounts and portions and in which media type?
- Participation
 - Individual learning session
 - Partner session
 - Group session

Reference:

Becking, D et al. (2004) *Didactic Profiling: Supporting the Mobile Learner*, ELEARN 2004, pp. 1760-1767

“The learner approaches learning episodes with various, often multiple, purpose. More than half of both mobile and non-mobile episodes take place to enable an activity (40%) and/or to solve a problem. In only about 5% of mobile, and 10% of non-mobile episodes, do purposes relate to curriculum. Satisfying curiosity is a frequently reported purpose in mobile (45%) and non-mobile (30%) episodes. Other reported purposes include the willingness to deepen understanding and develop skills, enjoyment, and externally imposed purposes (as in 'part of my job'). Finally, 8% of mobile and 15% of non-mobile episodes have no purpose at all.

Looking at learning purposes and intentions, it appears that mobile learning episodes are more 'open' than non-mobile ones: the learner explores more to satisfy their curiosity and end up learning more than anticipated or planned.

Learning episodes relate to various, and often multiple, areas of life. 41% of non-mobile and 48% of mobile episodes were associated with work (mobile locations for learning are often locations in the workplace other than the person's own office, so relevance to work is expected). The second most popular area that learning relates to is hobbies, at 17% for both mobile and non-mobile episodes. Other areas that equally frequent (each around 5%) cited as learning areas in both mobile and non-mobile episodes include formal courses, leisure and self-improvement. Housework and family-related learning is more frequent in non-mobile settings, whereas community work and social life-related learning is more frequent in mobile settings.

Various combinations of learning methods are employed in learning episodes. Conversation as a method appears in 45% of mobile and 21% of non-mobile episodes. Interaction with experts is another popular method in mobile episodes (39%), but less popular in non-mobile episodes (8%). In contrast, non-mobile episodes employ more often reading and watching media (39%) and self study (39%) in comparison to mobile episodes (31% and 17% respectively). Hand on experience (15%) and listening (5%) are equally frequent in both settings. It appears then that mobile episodes employ interactive and practical learning methods more frequently than non-mobile episodes.”

Reference:

Vavoula, G. (2005) *MOBILearn: WP 4 - Pedagogical Methodologies and Paradigms, D4.4 A Study of Mobile Learning Practices*.

Chapter 9: Student Use of mLearning

The students are from the Ericsson International Training Centre in Ireland

Mobile learning in action - This is a report on the effectiveness of mobile telephones in training (2002) – 9 students.

Mobile learning increases the quality of e-learning

22% Strongly agree

55% Agree

22% Uncertain

0% Disagree

0% Strongly disagree

Course learning objectives can be met by mobile learning

11% Strongly agree

66% Agree

22% Uncertain

0% Disagree

0% Strongly disagree

Use of mobile telephones in training in Ireland (2002) – 20 students.

Mobile learning increases the quality of e-learning

0% Strongly agree

62% Agree

29% Uncertain

10% Disagree

0% Strongly disagree

Course learning objectives can be met by mobile learning

10% Strongly agree

66% Agree

14% Uncertain

10% Disagree

0% Strongly disagree

Student use in Norway - NKI in Norway

Table 1. Questionnaire section 1. Personal background

	n	%	n	%	n	%	n	%	n	%	N
1. Occupation	Manager		Technical		Teacher/trainer		Student				
	1	11	5	56	2	22	1	11			9
2. Age grouping	>24 years		25-29 years		30-40 years		41-50 years		> 50 years		
	1	11	-	-	4	44	2	22	2	22	9
3. Gender	Male		Female								
	9	100	-	-							9
4. Level of education	High school		1-3 years p.s		4 ore more p.s.						
	1	11-	1	11	7	78					9
5. Mobile device ownership	Mobile phone		PDA		Both *						
	-	-	-	-	9	100					9
10. Where did you study? **	At home		At work		Both home/w		On travel***				
	2	22	-	-	2	22	5	56			9

*All the participants had got their PDA in connection with the project.

** In the questionnaire this question was put under 'user friendliness

*** No one ticked only "when travelling", 2 ticked all three alternatives, 2 ticked "at home and when travelling and 1 ticked at work and when travelling

Reference:

Keegan, D. (2002) *The Future of Learning: From eLearning to mLearning*. ZIFF Papers 119, Zentrales Institut für Fernstudienforschung, FernUniversität – Hagen

Reference:

Becking, D et al. (2004) *Didactic Profiling: Supporting the Mobile Learner*, ELEARN 2004, pp. 1760-1767

Furuya C., Kimura, M. & Ohta, T. (200) *Mobile Language Learning – A Pilot Project on Language Style and Customization*, ELEARN , pp. 1876-1880

Keegan, D. (2002) *The Future of Learning: From eLearning to mLearning*. ZIFF Papers 119, Zentrales Institut für Fernstudienforschung, FernUniversität – Hagen

Vavoula, G. (2005) *MOBILearn: WP 4 - Pedagogical Methodologies and Paradigms, D4.4 A Study of Mobile Learning Practices*.

1.7 Which conditions support mobile learning?

Requirement for the learner?

- Time
- Motivation
- Availability of learning materials
- Suitable learning activity (reading, writing, listening, speaking)

Entwistle, N. (1988). *Styles of Learning and Teaching*. London, David Fulton Publishers Ltd

Entwistle, N. and Ramsden, P. (1982). *Understanding Student Learning*. London: Croom Helm Ltd.

Gagné, R. (1974). *Essentials of Learning for Instruction*. Hinsdale, Illinois, USA, The Dryden Press

Gagné, R. (1985). *The Condition of learning and the Theory of Instruction*. 4th Edition. New York, USA, CBS College Publishing

1.7.1 Understanding student learning

Different Students/learners has different approaches / styles of learning. The learning even adapt to the learning objective. It is therefore very important that clear learning objectives are set out.

Gagné (1974) describes in *Essentials of Learning for Instruction* different phases of an act of learning and the processes associated with them:

- Motivation Phase is dominated by the expectations. There are various forms of motivation, for the promotion of learning only the incentive motivation. This reflects the human urge to manipulate, dominate and master his environment.
- Apprehending Phase is characterise with the student giving attention to a learner stimulus and the selective perception of it.
- Acquisition Phase includes the essential incident of learning with the coding of the information into the short-term memory and later into the long term storage.
- Retention Phase means the information is preserved in the memory of the learner.
- Recall Phase is the retrieval of the information. The memory is searched and the information is getting accessible.
- Generalization Phase is the transfer of the learned principles to similar problems in the same context or even the transfer of the principles outside the learned context.
- Performance Phase is responding and demonstrating to reflect what has been learned.
- Feedback is considered the essence of the learning process called reinforcement.

Based on this model learning objectives are designed for each of the different steps. Podcasts have to fit with their purpose into this model to make them useful for the students.

Learning Phase	Process	Influencing External Events
Motivation	Expectancy	<ol style="list-style-type: none"> 1. Communicating the goal to be achieved 2. Prior confirmation of expectancy through successful experience
Apprehending	Attention; Selective Perception	<ol style="list-style-type: none"> 1. Change in stimulation to active attention 2. Prior perceptual learning 3. Added differential cues for perception
Acquisition	Coding; Storage Entry	Suggested schemes for coding
Retention Recall	Storage Retrieval	Not known <ol style="list-style-type: none"> 1. Suggested schemes for retrieval 2. Cues for retrieval
Generalization	Transfer	Variety of contexts for retrieval cueing
Performance	Responding	Instances of the performance (“examples”)
Feedback	Reinforcement	Informational feedback providing verification or comparison with a standard

Gagné, R. (1974). *Essentials of Learning for Instruction*. Hinsdale, Illinois, USA, The Dryden Press

Entwistle, N. and Ramsden, P. (1982). *Understanding Student Learning*. London: Croom Helm Ltd.

Approach or style	Process		Outcome
	Stage I	Stage II	
Deep approach/versatile	All four process below used appropriately to reach understanding		Deep level of understanding
Comprehension learning	Building overall description of content area	Reorganizing incoming information to relate to previous knowledge or	Incomplete understanding attributable to globetrotting

		experience and establishing personal meaning	
Operation learning	Detailed attention to evidence and steps in the argument	Relating evidence to conclusion and maintaining a critical, objective stance	Incomplete understanding attributable to improvidence
Surface approach	Memorization	Over-learning	Surface level of understanding

p. 42

Level of understanding when reading an article (p. 85)

Approach to learning	Level of understanding when reading an article
Deep active	Understands author's meaning and shows how argument is supported by evidence
Deep passive	Mentions the main argument, but does not relate evidence to conclusion
Surface active	Describes the main points made without integrating them into an argument
Surface passive	Mentions a few isolated points or exam

Entwistle, N. (1988) *Styles of Learning and Teaching*. London, David Fulton Publishers Ltd.

1.8 Issues in Mobile Learning

- Interoperability among the different learning systems – the main reason is that the learning systems lack of the complete standard to interact each others
- The e-learning system design is short of transparent access
- The relationship among Learning Objects cannot be bound, so that the service-level agreements are short to control for collaborations of the working flow
- The integration of learning systems is unavailable

Liao, C. & Ou Yang, F. (2004) *A Collaborative Grid for Mobile Learning of English*, ELEARN 2004, pp. 2777 – 2785

Sharples, M. (eds) (2006) *Big Issues in Mobile Learning*. Report of a workshop by the Kaleidoscope Network of Excellence Mobile Learning Initiative

Trifonova, A. and Ronchetti M., (2003) *Where is Mobile Learning Going?*, ELearn, pp. 1794-1801

1.9 Evaluation of mobile learning

Sections about how other projects evaluated the outcome of projects

- Comparison from students results
- Student evaluation
- Formula about how to compare

References:

Hede, A. (2002) *An Integrated Model of Multimedia Effects on Learning*. Journal of Educational Multimedia and Hypermedia (2002) 11(2), p. 177 – 191

Four variables for comparison

- Instrumentation
- Type of research design

- Type of delivery system
- Comparison group

Syvänen, A and Nokelainen, P (2004). *Evaluation of the technical and pedagogical mobile usability*. In Proceedings of mLearn 2004, pp.191 – 195

Evaluation of mobile learning materials and environments
 Numbers in this table relate to the numbered lists of criteria in section 1

Technical		Pedagogical	
Component	Questions for the user relating to mobile material	Component	Questions for the user relating to mobile material
1 Accessibility	Manageability	2 Learner activity	How personal are the learning products?
2 'Learnability' and memorability	Cross-platform use	3 Cooperative learning	Flexibility in collaboration
3 User control	Attentiveness	5 Applicability	Support for contextual use
6 Reliability	Offline use		
7 Consistency	Cross platform use	6 Effectiveness	Added value of mobility
8 Efficiency of use	Manageability	8 Valuation of previous knowledge	Continuity of learning process
9 Memory load	Attentiveness		

Framework for Interactive Educational Radio Programs in Distance Education

Reference:

Volkan Yüzer, T. & Kurubacek, G. (2004). *Producing Interactive Educational Radio Programs for Distance Learning*, ELEARN 2004, p. 1587- 1594

Producing Interactive Educational Radio Programs in Distance Education			
Developing The Strategic Technology Plan Defining the current needs and expectations Planning technology requirements Examining personal sources and supports Communicating with stakeholders Creating standards based on the mission statement Developing the goals and objectives based on the ethics codes Creating the learning statement for interactive radio programs			
The Program Development Process Working on Project Timelines Budgeting to select the models of broadcasting			
Radio Programs with Live Broadcasting – synchronously			
Type	Purpose	Strategies	Components
synchronously	<ul style="list-style-type: none"> - Learning fact & conversations - Delving knowledge into resources - Discovering interrelate concepts from diverse discussions 	<ul style="list-style-type: none"> - Listening to experts & instructors - Speaking literally to learners - Bring course resources to life 	<ul style="list-style-type: none"> - Radio Receiver - Phone, Mobile Phone - Fax - Email - Internet lines
synchronously	<ul style="list-style-type: none"> - Learning fact & conversations - Delving knowledge into resources - Discovering interrelate concepts from multicultural discussions - Tracking diverse point of views to accomplish 	<ul style="list-style-type: none"> - Involving self-discipline and self-esteem through the structures and practices of real life - Being intertwined with critical thinking to organise knowledge from diverse culture around the world 	<ul style="list-style-type: none"> - Radio Receiver - CD ROMs - Phone, Mobile Phone - Fax - Handbook (ebook or traditional book) - Email, bulletin Board - Internet Lines

	the necessary steps		
synchronously	<ul style="list-style-type: none"> - Learning fact & conversations - Delving knowledge into resources - Discovering interrelate concepts from multicultural discussions - Tracking diverse point of views to accomplish the necessary steps - Achieving to solve problems to make decisions 	<ul style="list-style-type: none"> - Examining the consequences and effects to exchange ideas - Exploring all aspects of discussion topics and different viewpoints - Learning to take risk and responsibilities to gain greater insight into how to respect others, even when there is disagreement - Asking the right questions 	<ul style="list-style-type: none"> - Radio Receiver - CD ROMs - Phone, Mobile Phone - Fax - Activity Book Handbook (ebook or traditional book) - Email, bulletin Board - ePortfolio - Internet Lines
Radio Programs with taped broadcasting – asynchronously			
Type	Purpose	Strategies	Components
asynchronously	<ul style="list-style-type: none"> - Learning fact & conversations - Delving knowledge into resources - Discovering interrelate concepts from diverse discussions 	<ul style="list-style-type: none"> - Listening to experts & instructors - Speaking literally to learners - Bring course resources to life 	<ul style="list-style-type: none"> - Radio Receiver - Phone, Mobile Phone - Fax - Email - Internet lines
asynchronously	<ul style="list-style-type: none"> - Learning fact & conversations - Delving knowledge into resources - Discovering interrelate concepts from multicultural discussions - Tracking diverse point of views to accomplish the necessary steps 	<ul style="list-style-type: none"> - Offering new dimensions of learning to explore the concepts and facts from real life - Acquiring knowledge to form new ideas and conclusions - Motivating learners to share and exchange their experiences with others - Focusing on raise ideas and problems to clarify ideas and evaluate assumptions 	<ul style="list-style-type: none"> - Radio Receiver - CD ROMs - Phone, Mobile Phone - Fax - Handbook (ebook or traditional book) - Email, bulletin Board - Internet Lines
asynchronously	<ul style="list-style-type: none"> - Learning fact & conversations - Delving knowledge into resources - Discovering interrelate concepts from multicultural discussions - Tracking diverse point of views to accomplish the necessary steps - Achieving to solve problems to make decisions 	<ul style="list-style-type: none"> - Learning to take risk and responsibilities to gain greater insight into how to respect others, even when there is disagreement - Becoming more aware of how they think and finding ways to facilitate reasoned and logical knowledge-based thinking - Raising problems and asking the right questions to be thinker into rhythm society 	<ul style="list-style-type: none"> - Radio Receiver - CD ROMs - Phone, Mobile Phone - Fax - Activity Book Handbook (ebook or traditional book) - Email, bulletin Board - ePortfolio - Internet Lines
Interactive Educational Radio Programs with mixed broadcasting methods			
Type	Purpose	Strategies	Components
Synchronously + asynchronously	<ul style="list-style-type: none"> - Learning fact & conversations - Delving knowledge into resources - Discovering interrelate concepts from multicultural discussions - Tracking diverse point of views to accomplish the necessary steps - Achieving to solve problems to make decisions 	<ul style="list-style-type: none"> - Listening to experts & instructors - Evaluating feelings, beliefs and ideas based on reasonable criteria - Applying higher order thinking skills to everyday circumstances - Developing Socratic questioning to cope with the high tempo of life styles - Dealing with real life problems to empowering independent thinking skills 	<ul style="list-style-type: none"> - Radio Receiver - CD ROMs - Phone, Mobile Phone - Fax - Activity Book Handbook (ebook or traditional book) - Email, bulletin Board - EPortfolio - Interactive TV - F2F Classes - eClasses

asynchronously + synchronously		<ul style="list-style-type: none"> - Becoming an open-minded and objective thinker to reach reasonable conclusions - Learning to take risk and responsibilities to gain greater insight into how to respect others, even when there is disagreement - Becoming more aware of how they think and finding ways to facilitate reasoned and logical knowledge-based thinking - Raising problems and asking the right questions to be 	- Internet Lines
<p>The Evaluation of the Process</p> <p>Receiving feedback from the learner and stakeholders</p> <p>Managing the change process</p> <p>Revising the strategies and technology infrastructure to plan the knowledge networks process</p>			

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2.1 Associationism & CAL

MOBilelearn WP4 – Guidelines for learning/teaching/tutoring in a mobile environment

In the 1960s early developments in learning technology influenced the two predominant theories of learning – associationism and behaviourism. Skinner's brand of behaviourism was apply as a model which is based on the association between stimulus and responses enabled by reinforcement. This conditioning was apply to the learning technology in form "drill-and-practice and "present-test-feedback" exercises.

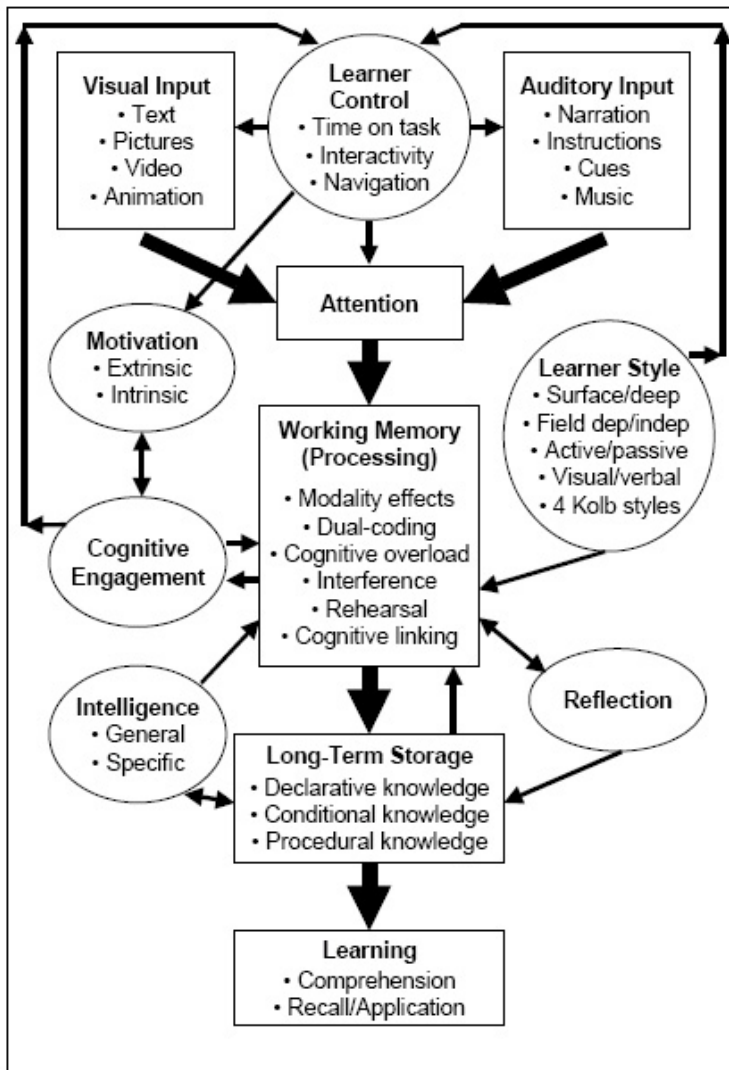
Today CAL is still used as a approach, even with the more advanced technology.

2.2 Information Processing Theory & ITS

MOBILElearn WP4 – Guidelines for learning/teaching/tutoring in a mobile environment

IN the 1970 the cognitive revolution and mental representation dominated the field. John Anderson developed one of the first information processing models. The General Problem Solver developed by Alan Newell and Herb Simon the focus is on problem solving and the mental memory operation and processes. “The critical step in problem solving is the definition of the goal to be achieved and the transformation rules”

Hede, A. (2002) *An Integrated Model of Multimedia Effects on Learning*. Journal of Educational Multimedia and Hypermedia (2002) 11(2), p. 177 – 191



Attention & Working Memory model was introduced 1992 by Baddeley

Dillon & Gabbard (1998) have characterised the Learner Dynamics & Learner Style

- Field dependence and field independence
- Surface processors / deep processors of information (memorisation & rehearsal/content structuring techniques)
- Activity/passivity of the learner

Knowledge and Learning consist of four elements

- Intelligences
- Reflection
- Long-term storage

- Learning

Long-term storage

“Long-term storage receives processed information from working memory but also supplies working memory with the basis for cognitive linking whereby connections are established between new content and what is already known.”

Limitation of the working memory model – various effects

- Koumi (2003) Modality effects – “This presupposes dual coding, whereby auditory and visual inputs can be processed simultaneously in working memory, which thereby leaves extra capacity for the learning process.”
- Kalyuga (2000) Instructional modality effect – “Modern views of working memory suggest that it consists of separate processors for auditory and visual information. The amount of information that can be processed using both auditory and visual channels might exceed the processing capacity of a single channel. Thus, limited working memory may be effectively expanded by using more than one sensory modality making learning easier.”
- Kalyuga (2000) Cognitive load theory – “We can process only a few elements of information in working memory at any one time. Too many elements of information may overwhelm working memory, decreasing the effectiveness of instruction.”
- Koumi (2003) Split attention

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2.3 Behaviourist learning

MOBilelearn WP4 – Guidelines for learning/teaching/tutoring in a mobile environment

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Mobile devices in particular can enhance the behaviourist learning process. Within behaviourist learning paradigm, learning is thought to be best facilitated through the reinforcement of an association between a particular stimulus and a response (drill and feedback).

The use of mobile devices to present teaching materials/content specific questions (stimulus), obtain responses from learners (response), and provide appropriate feedback (reinforcement) – provide ‘drill and feedback’ activities, fits within the behaviourist learning paradigm.

Case studies:

- Mobile phones for language learning: students were sent frequent vocabulary messages which also act as reminders to revise through SMS.
- Provide revision material via mobile phones using SMS text messages.
- “Drill and feedback”: use mobile devices to present content specific questions, gather student responses rapidly and anonymously, and assemble a public, aggregate display, to show variation in the group’s ideas.
- Mathematics video games.

2.4 Constructivist learning

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Constructivist learning is an active process in which learners construct new ideas or concepts based on their current and past knowledge (Bruner, 1966). Within a constructivist learning framework, instructors should encourage students to discover principles for themselves. In order to transform learners from passive recipients of information to active constructors of knowledge we must give them an environment in which to participate in the learning process, and the appropriate tools to work with that knowledge.

Mobile devices give us a unique opportunity to have learners embedded in a realistic context at the same time as having access to supporting tools. Each learner carries a networked device which allows them to become part of the dynamic system they are learning about.

Case studies:

- Games: participatory simulations where learners play an active role in the simulation of a dynamic system or process (PDA).

- Handheld games: where context-sensitive data (raw data) and social interactions (interviews with ‘virtual’ experts) are used to supplement real world interactions (Pocket PC).

2.5 *Situated learning*

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The situated learning paradigm (Lave et al., 1991) holds that learning is not merely the acquisition of knowledge by individuals, but instead a process of social participation. Brown et al (1989) also emphasise the idea of cognitive apprenticeship where teachers (the experts) work alongside students (the apprentices) to create situations where the students can begin to work on problems even before they fully understand them.

Situated learning requires knowledge to be presented in authentic contexts (settings and applications that would normally involve that knowledge) and learners to participate within a community of practice. By developing appropriate context-based teaching strategies with mobile technologies, we can fulfil both of these requirements.

Case studies:

- Natural science learning: use PDA to support field studies, e.g. taking observational notes, taking photographs, querying networked database and comparing data, etc.
- Multimedia museum: use Pocket PC to provide an interactive audio-visual tour, allowing visitors to view video and still images, listen to expert commentary and reflect on their experience by answering questions or mixing a collection of sound clips to create their own soundtrack for an artwork.

2.5.1 **Case-based Learning**

MOBILearn WP4 – Guidelines for learning/teaching/tutoring in a mobile environment

2.5.2 **Problem-based learning**

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Problem-based learning (PBL) (Koschmann et al 1996) aims to develop students’ critical thinking skills by giving them an ill-defined problem that is reflective of what they would encounter as a practicing professional.

Throughout the process of exploring a problem, students are encouraged to identify the areas of knowledge they will require to understand the problem. The group then collects these learning issues, along with data, hypotheses and plans for future inquiry in a structured manner, which can be facilitated by shared information resources (e.g. physical or electronic whiteboard), and uses the collected information to develop a plan for the next iteration of problem formulation, solution, reflection and abstraction.

Case studies:

- Medical education
- Business administration
- Nursing

2.5.3 Context awareness learning

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Context awareness means gathering information from the environment to provide a measure of what is currently going on around the user and the device. Activities and content that are particularly relevant to that environment can then be made available.

Mobile devices are especially well suited to context-aware applications simply because they are available in different context, and so can draw on those contexts to enhance the learning activity. Context-aware mobile devices can support learners by allowing a learner to maintain their attention on the world and by offering appropriate assistance when required.

Context awareness is being explored not just as a way to deliver appropriate content but to enable appropriate actions and activities, including interactions with other learners in the same or similar contexts.

Case studies:

- Multimedia museum and gallery: provide additional information about exhibits and displays based on the visitor's location within them.

2.6 Sociocultural theory of learning

2.6.1 Socio-cultural theory –CSCL

MOBIlearn WP4 – Guidelines for learning/teaching/tutoring in a mobile environment

2.6.2 Taylor, J. Pedagogy in the mobile learning environment. The Open University

Recent developments in pedagogy, moving away from the transmissive, behavioural models and more toward the constructivist or socio-cognitive models, place the active learner at the heart of activities. The socio-cognitive view would also add that learning takes place in a social context (Rogers, 2002), and the forming and re-forming of concepts need not necessarily take place only at the level of the individual, but that collaborative group work and sharing with peers (and others) can be a powerful way of confronting one's own conceptions (pre-conceptions), contributing to the need to restructure one's cognitive schemas. So learning is perceived as being as much about communication as it is about content. Of course, communication is not confined to peer-to-peer. It can involve teachers, experts, experienced colleagues, workmates, friends and family.

In fact some more radical pedagogical approaches would go a step further, and suggest that no content is a useful starting point for courses – the group of learners themselves decide what they are going to learn, and how they are going to learn it, bringing their own material to bear in whatever way they feel appropriate.

The mobile environment can make a significant contribution to this process. By facilitating the rapid access to other users any time/any place, sharing content, knowledge, experience and gossip, learners can develop 'communities of practice' (Wenger, McDermott and Snyder, 2002) as well as informal discussion groups, as and when needed to optimise their learning processes.

2.6.3 Collaborative learning

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There is a specific focus on the use of mobile technologies to promote, facilitate and enhance interactions and collaborations between students.

Both the capabilities of mobile devices and their wide context of use contribute to their propensity to foster collaboration. Mobile devices can easily communicate with other devices of the same or similar type, enabling learners to share data, files and messages. They can also be connected to a shared data network, further enhancing possibilities for communication. These devices are also typically used in a group setting, and so interactions and collaboration will tend to take place not just through the devices but also at and around them as well.

2.6.4 Conversational learning

NESTA Futurelab Series Report 11: Literature review in mobile technologies and learning

Conversation theory (Pask, 1976) describes learning in terms of conversations between different systems of knowledge. Learning is a continual conversation with the external world and its artefacts, with oneself, and also with other learners and teachers. The most successful learning comes when the learner is in control of the activity, able to test ideas by performing experiments, ask questions, collaborate with other people, seek out new knowledge, and plan new actions.

The most compelling examples of conversational learning occur when mobile technology is used to provide a shared conversation space. Effective learning occurs when people can converse with each other, by interrogating and sharing their descriptions of the world.

Case studies:

- Mobile computer supported collaborative learning (MCSCCL) system: teacher's handheld device (Pocket PC) is used to distribute activities to a mobile network, students work in collaborative groups (students have to come to agreement before the answer can be submitted), teacher collects students works through Pocket PC.

J. Taylor, M. Sharples, et al. Towards a task model for mobile learning: a dialectical approach

Conversation theory views learning as a process of “coming to know” by which learners in cooperation with peers and teachers, construct an interpretation of their world.

M. Sharples. Disruptive devices: mobile technology for conversational learning

3 C's of effective learning: construction, conversation, and control. Effective learning involves constructing an understanding, relating new experiences to existing knowledge. Central to this is conversation, with teachers, with other learners, with ourselves as we question our concepts, and with the world as we carry out experiments and explorations and interpret the results. And we become empowered as learners when we are in control of the process, actively pursuing knowledge rather than passively consuming it.

Conversation theory describes learning in terms of conversations between different systems of knowledge. A more effective form of learning is when people can converse with each other by interrogating and sharing their descriptions of the world.

The technology could provide an environment in which conversational learning takes place; one that enables conversations between learners. It extends the range of activities and the reach of human discussion, into other worlds through games, software models and simulations and to other parts of this world by using computer as a means of communication, through phone, email and computer based discussions.

A mobile learning device can assist conversational learning by integrating learning descriptions across different locations, for example by making connections between exhibits in a museum, and by holding the results of learning actions for later retrieval and reflection. It can also provide tools to support learning in context, such as electronic measuring instruments, maps, and reference guides.

2.7 Activity theory

J. Taylor, M. Sharples, et al. **Towards a task model for mobile learning: a dialectical approach**

Sociocultural theory and its near relation activity theory derive from the work of Vygotsky (1978), who attempted to describe learning and development as a process mediated by tools.

In activity theory, the focus is on the activity itself, including the processes by which social, cultural and historical factors shape human functioning (Daniels, 2001). Activity theory has been applied to the study of pedagogy (Daniels, 2001), and to the analysis and design of technology-mediated activity by Kuutti and others.

Activity theory provides a framework to analyse the mediating role of new technology in activity of learning, and the inevitable contradictions that arise from introducing new technology into an environment such as a classroom or workplace.

E. Scanlon, A. Jones and J. Waycott (2005). **Mobile technologies: prospects for their use in learning in informal science settings.**

Activity theory builds on the work of Vygotsky (1978, 1987) and is a way of considering learning using three features – involving a subject (the learner), an object (the task or activity) and tool or mediating artefacts. Its central tenet is that human behaviour is situated within a social context that influences their actions. The meanings of actions are mediated by the rules of their community and the division of labour within the community influences the ways in which we behave.

Activity theory is specifically a way of unpacking the influence of the setting (social and technological) on learning.

Mobile technology can be used to create a new space for learning. Rather than being attached to constraints of time or place complex environments are being created by the mediation of technology. In the museum examples, the space inhabited by learners includes the physical space of the museum but also the virtual space which includes further electronic resources and the possibilities of learners interacting and collaborating with others both physically and virtually. The artefacts they interact with include physical paintings and installations as well as audiovisual resources on the mobile device, and of course the physical mobile device itself.

The emphasis that Activity Theory places on tools, including computer based tools in the way activities are mediated is very helpful. This shifts our attention away from simply the interaction between computer and to the activity as a whole. Activity Theory is a productive way to evaluate learning environments that are rich in technology.

Case studies:

- Museum Art Gallery exhibit: the PDA contained background information in a variety of media about works on display, in addition to games, opinion polls and the possibility of communication with other visitors via standard text messages. The PDA introduced many possibilities and constraints to the activity of learning in the museum. The main possibility – the use of multimedia content appeared to enhance the activity, expanding the type of information available to visitors (Waycott, 2004 p.215).

2.8 Informal, Adult and lifelong learning

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Learning happens all the time and is influenced both by our environment and the particular situations we are faced with. Informal learning may be intentional, for example through intensive, significant and deliberate learning ‘projects’ (Tough, 1971), or may be accidental by acquiring information through conversations, TV and newspapers, observing the world, or even by experiencing an accident or embarrassing situation. Indeed, studies of informal learning (Tough, 1971; Livingstone, 2001) show that most of adults’ learning happens outside formal education. While informal learning is a reality in people’s lives, they may not recognise it as learning.

Thus, people learn in order to be able to perform a new task, or even to be able to carry out a routine task in a better, more efficient or elegant way. Technology that is used to support learning should be blended with everyday life in the same way that learning is blended with everyday life: seamlessly and unobtrusively. Mobile technologies, with their reduced size and ease of use, provide the potential to support such activities.

With regard to accidental learning, learning episodes are impossible to predict. The personal and portable nature of mobile technologies makes them very strong candidates for recording, reflecting on and sharing this type of informal learning.

Case studies:

- Mobile devices for breast cancer patients: delivery of text, images, and audio-visual material to the patients’ PDAs via the internet and the hospital’s intranet, the user can query specific subject knowledge bases through a content specialist, patient communication is enabled via SMS, allowing a patient community to share valuable insights and experiences.

E. Scanlon, A. Jones and J.Waycott (2005). “Mobile **technologies: prospects for their use in learning in informal science settings**”.

Vavoula (2004) suggests that informal learning could be defined as a process of learning that occurs autonomously and casually without being tied to highly directive curricula or instruction.

M. Sharples (2000). **The design of personal mobile technologies for lifelong learning**

Lifelong learning is a means of providing people with the knowledge and skills they need to succeed in a rapidly changing world. The basic premise of lifelong learning is that it is not feasible to equip learners at school, college or university with all the knowledge and skills they need to prosper throughout their lifetimes. Therefore, people will need continually to enhance their knowledge and skills, in order to address immediate problems and to participate in a process of continuing vocational and professional development. The new educational imperative is to empower people to manage their own learning in a variety of contexts throughout their lifetime (Bentley, 1998).

The convergence of lifelong learning and personal technology:

Lifelong Learning	New Technology
Individualised	Personal
Learner centred	User centred
Situated	Mobile
Collaborative	Networked
Ubiquitous	Ubiquitous
Lifelong	Durable

2.8.1 Adult Learning

MOBIlearn WP4 – Guidelines for learning/teaching/tutoring in a mobile environment

2.8.2 Informal Learning

MOBIlearn WP4 – Guidelines for learning/teaching/tutoring in a mobile environment

2.8.3 Lifelong Learning

MOBIlearn WP4 – Guidelines for learning/teaching/tutoring in a mobile environment

2.9 A lack of mobile learning theory

J. Taylor, M. Sharples, et al. **Towards a task model for mobile learning: a dialectical approach**

Most theories of pedagogy fail to capture the distinctiveness of mobile learning. This is because they are theories of teaching, predicated on the assumption that learning occurs in a classroom environment, mediated by a trained teacher.

Any theory of mobile learning must embrace the considerable learning that occurs outside the classroom and is personally initiated and structured. It must also account for the dynamics of learning. A relevant theory of learning must embrace contemporary accounts of the practices and ontology of learning. Learning is a constructive process, involving the active construction of knowledge.

Thus, theories of learning must be tested against the following criteria:

- Do they account for both formal and informal learning?
- Do they analyse the dynamic context of learning?

- Do they theorise learning as a constructive and social activity?

MOBIlearn WP4 – Guidelines for learning/teaching/tutoring in a mobile environment

3 Audio in Education

3.1 Radio and Education

3.1.1 Characteristics of radio

- Radio is a blind medium, it is seen as interpersonal in which the sender and the receiver of the messages are not insight from each other. "Radio's codes are purely auditory, consisting of speech, music, sounds and silence."
- The most famous advantage of the radio is its appeal to the imagination. Because it offers sound-only instead of sound and vision the listener is compelled to 'supply' the visual data for himself. The details are described, or they may suggest themselves through sound, but they are not 'pictured' for him. The imagination is more than a merely visual faculty. It can re-create abstract qualities and process and helps uses 'different' channels for the learning process. The derivation from 'image' suggests; for in replicating the functions of our senses it seems also to replicate the hierarchy into they appear to arrange themselves. This all largely depends on the listener's ability to imagine matters.
- Another advantage is its flexibility; radio leaves the listener free to perform other activities while he is listening.

Crisell, A. (1994) *Understanding Radio*. 2nd Edition. London: Routledge

"Radio is called as a blind medium. There are no images and visual signs on radio broadcastings, but audio. This feature is usually mentioned as the weakness of radio. This, however, is the one unique quality of the radio that distance learners attempt themselves to visualize everything they listen. Therefore, imagination occurs in the mind of learner, and they construct knowledge themselves."

Reference

Kurubacak, G. & Volkan Yüzer, T. (2004) *The Building of Knowledge Networks with Interactive Radio Programs in Distance Education Systems*, ELEARN 2004, pp. 2360-2367

Many articles of the last two decades have been written about television and how it changed the world as a mass communication mean. Radio has fundamental advantages:

- in reaching more learner in developing countries. Listen o the radio does not require any special skills.
- To read a newspaper we have to learn how to read, "but once we have learned to speak, all we need to understand information from the radio is to pay attention what is said". (p 24)
- Immediacy
- Cost

Reference

Richard C. Burke (1976) *The use of radio in adult literacy education*, Hulton Educational Publications Ltds., Tehran, Iran

Chapter 1: Why radio? (p. 23)

3.1.2 Radio - Advantages

Radio has the major advantage that it can reach large numbers of listeners, spread over a large geographical area, more or less simultaneously, and at relatively little cost.

Five main roles for radio

- News and information
 - About opportunities and options available to them
 - About their courses, course materials, assignments and exams
 - About the experience of fellow students and trainees
 - About issues of common interest and concern
- Motivation and mobilisation - radio relies mainly on the human voice, it is a very personal and direct medium

- When they lack confidence to embark on a course of studies
- When they first start studying and are anxious about whether they can cope
- When they are facing their first assignment or examination
- When they are finding the work difficult and are tempted to give up.
- By providing timely encouragement and support, radio can reduce the drop-out rate and increase the rates of course completion
- Tutorial support - provide tutorial support, both of a general kind and linked specifically to the courses students are studying
 - Assistance with study skills - organising time, making notes, preparing assignments, revising for and taking exams;
 - Introductions to new areas of study and reviews of topics covered;
 - Help with key concepts, difficult ideas and new approaches;
 - Additional illustrations, examples and explanations, alternative ways of applying knowledge and developing skills;
 - Advice, guidance and feedback on study activities and practical work.
 - personal contact with a teacher to give students a feeling of being a 'real' student
- Resource material
 - Listening and learning experiences that are not readily available through print or face-to-face contact
 - It can bring students the voices and views of people with particular experience and expertise.
 - It can take students to places and situations that they would not normally be able to visit and experience.
 - Radio drama can stimulate and excite the imagination; transport students to real and imagined worlds; expose them to ideas and opinions outside their normal experience; explore difficult and sensitive issues; and challenge conventional ways of thinking.
 - It can present a range of resource material, which students can analyse and evaluate, and which can serve as a stimulus for reflection, discussion and debate.
- Direct teaching - as a substitute rather than a support to the use of print or face-to-face contact
 - This is particularly important when open and distance learners have low levels of literacy, or are finding it difficult to adjust to the demands of using printed texts.
 - It is also important when sounds are central to the process of teaching and learning $\text{\textcircled{D}}$ as in language or music teaching.
 - In addition, direct teaching by radio can provide valuable support to conventional teachers. It is particularly useful for subjects in which teachers lack confidence or experience, perhaps because of inadequate training or the introduction of new approaches and subjects into the curriculum.

Disadvantages:

- Programmes are broadcast at fixed times. These may not always be convenient for students. Also, they may not fit in with the student's work on the other media being used in a course.
- Radio reception in some areas may be poor. Some students will not always be able to receive a clear signal.
- Radio is transitory and ephemeral. Its programmes can usually only be heard once and then they disappear. You can of course record the programmes off-air for later listening: but then we're not really talking about radio, but rather audio cassettes. Also, programmes can be repeated: but that reduces the time available for other educational output.
- The pace of radio is dictated by the broadcasters. Students can't pause to think about what they've just heard. They can't stop the programme to apply knowledge or practise skills. They usually have to wait until the programme is finished.

- Radio is essentially a one-way medium. It talks to the student; but it doesn't usually give the student a chance to answer back & to raise questions or ask for further explanation. (This situation is changing with the use of the phone-in and e-mail: but not all students have access to these facilities.)
- Radio transmission time is likely to be limited. Teachers and students may not have as much access to the medium as they need.
- Also, much of the airtime made available to education tends to be at unsociable and inconvenient hours & late at night or early in the morning. And as more radio stations are being privatised, educational broadcasting is becoming much more expensive.
- And of course, radio is a sound-only medium. It lacks the visual dimension that will be very important in many types of teaching and learning.

Reference:

Thomas, J (2001) *Audio for Distance Education and Open Learning*, Vancouver/Cambridge: The Commonwealth of Learning and the International Extension College

3.1.3 History of Educational Radio

The first transmission of the British Broadcasting Company was in 1922. Education was seen as a cornerstone of the broadcasting policy. John Reith, the newly appointed General Manager of the British Broadcasting Company, saw broadcasting as a new chance to educate the whole community. Broadcasting began on 14th November 1922 mainly with election news and election results. In 1924 support material was printed in Radio Times to accompany a modern language course.

Radio Listening Groups immediately formed for two reasons: Firstly, Access to the radio/wireless equipment was not commonly available and secondly, people enjoyed learning together. In the Thirties group listening movement has gathered pace with a steady increase of wireless listening groups for serious broadcasting. The Radio Listening groups enjoyed popularity through the forties and fifties. In the sixties the idea of having a 'University of the Air' gathered pace and the Open University was established in 1969. Radio Listening Groups/Radio Forum or Interactive Radio Instruction was still popular in reaching less developed areas.

Reference:

Robinson, J. (1982) *Learning over the Air*. London: British Broadcasting Corporation

Radio Listening Groups or Radio Forums

Radio for Education and Development. Case Studies. Volume II. 1977 – Informal Education
Chapter VIII: Tanzania. Uchaguzi NI WAKO

- Radio is used as part of a program with several studies
 - Booklet/study guide
 - Radio series
 - Group listening of the radio program
 - Group study
 - Pre-campaign training of study course leaders
- Radio program consist of:
 - Interviews
 - Commentaries to simulate as much interest as possible
 - Question time
 - Election story: dramatic form to highlight main points

WAKATI WA FURAHHA

1969-1970 Pilot of the program

1971 Launch of the series

The education program consist of 3 elements: radio program, textbook and the study guide.

The radio program contains 15 min of actual studies and 15 min of music, answers to

questions and announcements. Interesting point about the study is the determination of the ideal group size for the group listening. Problems occurred when groups were between 25 and 35 people. The recommended size is 15-20 listeners. The radio series was a really successful campaign with 20% increase of knowledge of vital health practices among 2 million citizens. "One of the highlighted problems of the radio study groups is after the initial enthusiasm the interest is and therefore the attendance at the forums tends to decrease, and that such projects therefore have a limited life span."

Important characteristics of radio study groups are:

- They can operate without the physical presence of teachers or subjects experts
- Encourages equal and democratic participation by group members
- Disadvantage: no opportunity for poorly understood points to be explained

Chapter IX: Radio in an African Context: A description of Senegal's Pilots Project
Radio as Dialogue

- Success is a tribute to the quality and style of the radio production
- 70% of radio programs were recorded outside the normal radio studio – this is seen as the key to the success "It is the voice of the peasant talking freely into the microphone in the shade of his village tree, who speaks from the heart in his inimitable style and with personal conviction – this has caught the ear of Senegal."
- Field-based recording vs. studio production
- The essential quality of the educational broadcaster is to be "engaged" and thoroughly committed.
- One of the key conclusion is that the style of the production is as important as the contents
- Only when the audience experiences personal identification with the programs will it respond to their educational message

Chapter X: Open Broadcast Educational Radio: Three paradigms (Jonathan Gunter and James Theroux)

- There are two ways "top down communication" or "bottom up communication".
- Radio Quiz is a different way of reaching listeners. They participate as contestants in a interactive radio program. The programs seems to be successful if the format is not based on a sterile studio recording
- Students/listeners don't seem to mind reduction in recording if the style/presentation is appealing.

Reference

Spain, P.L., Jamison, D.T. and McAnay, E.G. (eds.) (1977) *Radio and Development: Case Studies. Vol. II*, World Staff Working Paper No. 266, Washington: The World Bank

References:

Bosch, A. (1997) *Interactive Radio Instruction: Twenty-Three Years of Improving Educational Quality*, Education and Technology Notes, Vol 1, No. 1, Washington DC: World Bank Human Development Department Education Group - Education and Technology Team

Burke, R. (1976) *The use of radio in adult literacy education*, Hulton Educational Publications Ltds., Tehran, Iran

Crisell, A. (1994) *Understanding Radio*. 2nd Edition. London: Routledge

Kurubacak, G. & Volkan Yüzer, T. (2004) *The Building of Knowledge Networks with Interactive Radio Programs in Distance Education Systems*, ELEARN 2004, pp. 2360-2367

Meed, J. (1976) *The Use of Radio in the Open University's Multi-Media Educational System, 1971-1974*, IET Papers on Broadcasting No. 60, Milton Keynes: Open University

Potter, C. and Naidoo, G., (2006) *Using Interactive Radio to Enhance Classroom Learning and Reach Schools, Classrooms, Teachers and Learners*. Distance Education, Vol. 27, No. 1, May 2006, pp. 63–86

Robinson, J. (1982) *Learning over the Air*. London: British Broadcasting Corporation

Spain, P.L., Jamison, D.T. and McAnay, E.G. (eds.) (1977)*Radio and Development: Case Studies. Vol. II*, World Staff Working Paper No. 266, Washington: The World Bank

3.2 Audio Cassettes and Education

The compact audio cassette medium was introduced in 1963 by Philips, and in the U.S. in 1964. Although other magnetic tap systems were available; the Compact Cassette became dominate when Philips decided to license the format free of charge.

“The use of audio tapes shows effects on retention rates and performance.”

Reference:

Crockett, N. & Pettersons, M. (1990) *A comparative study pf effects of tutorial audio tapes in teaching elementary statistics*, Open Learning, 5(1), pp. 53-56

How students work with audio cassettes? – Example OU a293 Rome: The Augustan Age (second level half course credit)

- 82% reported no problems with the stop/start/replay facilities
- 92% listened to Band 1
- 89% listened to Band 2
- no information about Band 3
- 51% worked through in their own way mostly listening straight through “because they were curious to see what was on the tape” “liked to focus on the overall picture”
- 80% work through learning units, despite listening to it first
- 75 listened to it earlier
- only 40% listened to it again in conjunction with the course work
- This deviance from the instructions is important for two reasons:
 1. It calls into questions our reliance on students to think through exercises before tuning to the discussions. Students are more concerned with conclusions, course teams with learning
 2. Underestimation of excitement and curiosity felt by students when they tackle something new at the beginning of the academic year. Working in a co-ordinated way can provide useful reinforcement of essential material
- Audio tapes can be seen as a motivation and moral booster

Reference

Hardwick, L. (1984) *Audio-Cassettes in an Interdisciplinary Course*. Teaching at a Distance, No. 25, Autumn 1984, pp. 27-32

Audio cassettes -Advantages

- Audio cassettes offer students a much higher level of control over the way they use the material. Provided they have access, either individually or in groups, to cassette players and sources of power, students can listen when, where, how and as often as they like.
- The technology also allows students to stop, start, re-wind and fastforward the tape. This makes it much easier to integrate the use of audio with other learning materials (e.g. printed texts), and learning activities (e.g. reading, writing, applying what they’ve learned, practising skills, sharing and discussing ideas and experience).
- Audio cassettes are also generally no more expensive to produce and distribute than radio, unless very large numbers of students are involved. Initial production costs for radio and audio cassettes are likely to be more or less the same. Multi-copying, packaging and distribution of cassettes will involve additional expense; but these costs are generally offset by the fact that radio stations are increasingly tending to charge educational institutions for the transmission of radio programmes. But even if audio cassettes do cost more, this is usually more than justified by their increased educational effectiveness.

Reference:

Thomas, J (2001) *Audio for Distance Education and Open Learning*, Vancouver/Cambridge: The Commonwealth of Learning and the International Extension College

References:

- Crockett, N. & Pettersons, M. (1990) *A comparative study of effects of tutorial audio tapes in teaching elementary statistics*, *Open Learning*, 5(1), pp. 53-56
- Hardwick, L. (1984) *Audio-Cassettes in an Interdisciplinary Course*. *Teaching at a Distance*, No. 25, Autumn 1984, pp. 27-32
- Thomas, J (2001) *Audio for Distance Education and Open Learning*, Vancouver/Cambridge: The Commonwealth of Learning and the International Extension College
- Jaya Prasada Rao, J.T. (1998) *Interaction in distance learning – the role of audio-cassettes*. *Open Praxis*, Vol. 2, pp. 31-32

3.3 Audio-Vision

By audio-vision, we simply mean the combination of audio media - radio and particularly audio cassettes with visual material. The visual materials are usually in printed form e.g. specially prepared notes, worksheets, flip-chart illustrations, posters, etc. But they can also be in the form of slides, film strips, models or real objects, either specially provided for the student, or available in the local environment.

Three main advantages of audio-vision

From the teacher's point of view, the combination of audio and visual materials offers at least three major advantages:

First, it extends the scope and increases the effectiveness of audio. More subjects can be taught more effectively using audio with visual support.

Secondly, audio-vision promotes student-active learning. This can happen both when the tape is running and when it's been stopped. As well as listening, students are encouraged to look at illustrations, analyse and interpret visual material, and undertake a range of other activities which reinforce learning.

Third, visual materials also help students concentrate on the audio.

Many students find it difficult to concentrate on sound-only material, particularly if they're new to studying with audio. Well designed visuals help students focus their attention on the sounds, and help them get more out of the experience of listening. These three advantages can also be seen as benefits from the students' point of view. Audio-vision means students can be offered audiobased learning on a wider range of subject matter. It encourages greater interaction with the audio materials, with opportunities to apply what they're learning, develop and practise skills, explore attitudes and values, and learn more effectively. Audio-vision also helps them focus on what they're listening to and get more out of it. Students also find that the visual material is often useful as a summary of the audio and an aid to revision. And perhaps most important, most students seem to enjoy using audio-vision. It adds variety and interest to their experience of learning at a distance.

Thomas, J (2001) *Audio for Distance Education and Open Learning*, Vancouver/Cambridge: The Commonwealth of Learning and the International Extension College

3.4 Walkman

The Compact Disc was first introduced in 1982 and conquered the market in the nineties. Why did the walkman not take off?

3.5 New technologies

The limitation of audio was the one way communication. Learner could not ask questions or interact. The learner or the audience cannot comment on the usual radio programs or audio tapes, no immediate feedback is given. With the use of telephones, internet, emails or mobile phones the possibilities of multi-way interactivity / two-way communication is created. Learner / students can give immediate comments or feedback on the program and can even have a significant influence on the program.

Reference:

Volkan Yüzer, T. & Kurubacek, G. (200) Producing Interactive Educational Radio Programs for Distance Learning, ELEARN, p. 1587- 1594

Taylor, J., Bo, G., Labs, G., Bernazzanu, R. and Sharples, M. (2005) MOBIlearn: *WP 4 - Pedagogical Methodologies and Paradigms, D4.1 Guidelines for learning/teaching/tutoring in a mobile environment.*

Technical Advantages of the MP3 player:

- Small
- Robust
- Easy to download
- Widely spread

	Radio	Audio-Cassette	CD	mp3
Accessibility	Fixed radio times	Anytime	Anytime	Anytime
Devise	Radio widely available	Audio player widely available – on the decline	CD player widely available	Mp3 files can be played on a variety of devise: <input type="checkbox"/> Laptop <input type="checkbox"/> Mp3-player <input type="checkbox"/> CD-player <input type="checkbox"/> PC <input type="checkbox"/> Phone <input type="checkbox"/> PDA
Play Medium	Not necessary	Not very robust	Robust	No medium, just file transfer
Individual learning pace	Not possible	Yes	Yes, with difficulties after switching off	Yes, with difficulties after switching off
Reproduction cast	No	Yes	Yes	No

4 Podcasting

4.1 What is podcasting?

“Podcasting is the method of distributing [multimedia](#) files, such as audio or video programs, over the [Internet](#) using [syndication](#) feeds, for playback on [mobile](#) devices and personal [computers](#). The term, coined in 2004, is a [portmanteau](#) of [iPod](#) and [broadcasting](#).

The term podcast, like '[radio](#)', can mean both the content and the method of delivery. The [host](#) or [author](#) of a podcast is often called a podcaster. Though podcasters' web sites may also offer direct [download](#) or [streaming](#) of their content, a podcast is distinguished from other formats by its ability to be downloaded automatically using software capable of reading feeds like [RSS](#) or [Atom](#).

Usually a podcast features one type of 'show', with new episodes released either sporadically or at planned intervals such as daily or weekly. In addition, there are podcast [networks](#) that feature multiple shows on the same feed.”

Wikipedia, accessed 20th September at <http://en.wikipedia.org/wiki/Podcasting>

4.2 History of podcasting

The concept of podcasting was suggested as early as 2000 and its technical components were available by 2001, then implemented in the program [Radio Userland\[1\]](#). In 2003 regular podcasts started showing up on well-known Web sites and software support spread.

Wikipedia, accessed 20th September at <http://en.wikipedia.org/wiki/Podcasting>

4.3 Variety of podcasts

4.3.1 Information aspect

- **Traditional course information:**
audio lecture / recording of a traditional face-to-face lecture
- **Additional Material**
material which enhances the student experience, still relevant to the course
- **Supplement information**
(not relevant to passing the exams – about how the university works) more of distance learners in form of talk, dialogue, interview, group discussion
- **Student material**
which consists of podcasts from students for the lecturer or students

4.3.2 Learning activity

- **Just listening.** Talks, discussions, interviews, acted scenes, natural sounds – material from which people can learn even when their eyes and hands are busy with other things, e.g. driving a car or washing dishes
- **Listening and looking.** Here learners have to use their eyes as well as their ears. They get printed material to use along with the audio-tape.
- **Listening, looking and doing.** Sometimes the audio may ask learners to stop the tape and write something in their workbook, or carry out some practical work with materials and equipment, or even with people. When they switch on again the audio teacher will comment on what they have done.

Reference

Rowntree, D. (1992) *Exploring Open and Distance Learning*. London, Kogan Page Limited.

Rowntree, D. (1994) *Teaching with Audio in Open and Distance Learning*. London, Kogan Page Limited.

4.3.3 Format

Richard C. Burke (1976) *The use of radio in adult literacy education*, Hulton Educational Publications Ltds., Tehran, Iran 1976 - Chapter 4: Programme Development (p. 41)

- **The talk, or radio lesson**
”This is a simple, straightforward style, usually presented by someone trained in both teaching methods and the techniques of microphone performance. It is often referred to as a radio lesson or a radio class. In many ways, the characteristics of a good radio teaching lesson are the characteristics of good teaching in general, with the exception that the radio teacher must show concern, understanding and support for the learner by means of the voice only. Therefore, teaching or speaking on radio requires the speaker to have what is called ‘presence’ – a sense of being there with the listener, talking directly to him.”
- **The dialogue (p. 45)**
”The dialogue is a form of presentation in which two speakers, instead of one, present the information. The dialogue offers the listener greater variety than the single speaker; therefore, it has considerable merit as a means of stimulating and maintaining interest in the radio lesson.”
- **The interview (p. 46)**
”Occasionally, radio producers have a limited idea of the usefulness of the interview. They tend to invite well known ‘experts’ or ‘specialists’ in certain areas to participate in the radio programmes, but they often forget that many listeners who are not ‘expert’ have valuable ideas which should be shared with others.”
- **The discussion (p. 48)**
”The discussion is a relatively simple format which is closely related to the interview. A discussion group usually consists of one person, who acts as moderator or leader of the discussion, and three or four participants or guests. The people who participate in the discussion

may be experts on some particular subject, or simple a group of learners with a common interest as their topic.”

- **The dramatization (p. 50)**

”The radio play has been a popular format for many years, either as an entire programme or as a segment within a programme. It is popular because it contains all the elements that appeal to most people – a good story, well-developed characters, interesting dialogues, and sound effects and music to enhance the performance.”

4.3.4 *Sounds/speech/noise/music/silence*

John, D & Boucouvalas, A (2002) *User Performance with audio: The effect of subjects’ cognitive styles*. Educational Psychology, 22 (2), 133 -147

- Speech
 - **Recorded voice**
 - Synthetic voice
- Non speech
 - Music
 - Noise

Technical key factors

- **Pitch** (frequency of the sound wave)
- **Loudness or intensity**
- **Timbre** (the difference between two different instruments playing at the same pitch and frequency)
- **Consonance / dissonance** (two or more tones played simultaneously)
- **Location** (where the sound is coming from)
- **Perception of speech**

References:

John, D & Boucouvalas, A (2002) *User Performance with audio: The effect of subjects’ cognitive styles*. Educational Psychology, 22 (2), 133 -147

Burke, R. (1976) *The use of radio in adult literacy education*, Hulton Educational Publications Ltds., Tehran, Iran 1976

Chapter 4: Programme Development (p. 41)

4.3.5 *Live or taped*

- Live Broadcasting
- Taped Broadcasting

Main differences is the immediate feedback in the live broadcasting

Reference:

Volkan Yüzer, T. & Kurubacek, G. () *Producing Interactive Educational Radio Programs for Distance Learning*, ELEARN, p. 1587- 1594

4.3.6 **Studio or Field recording**

References:

Burke R.C. (1976) *The use of radio in adult literacy education*, Hulton Educational Publications Ltds., Tehran, Iran 1976

John, D & Boucouvalas, A (2002) *User Performance with audio: The effect of subjects’ cognitive styles*. Educational Psychology, 22 (2), 133 -147

Rowntree, D. (1992) *Exploring Open and Distance Learning*. London, Kogan Page Limited.

Rowntree, D. (1994) *Teaching with Audio in Open and Distance Learning*. London, Kogan Page Limited.

Volkan Yüzer, T. & Kurubacek, G. () *Producing Interactive Educational Radio Programs for Distance Learning*, ELEARN, p. 1587- 1594

5 General Application

5.1 Current Use

JISC Report: *Landscape Study in Wireless and Mobile Learning in the post-16 sector*, Current Uses of Wireless and Mobile Learning, Agnes Kukulska-Hulme, The Open University

- Current uses of wireless and mobile technologies in teaching and learning
- Main types of uses
- Impacts on teaching, learning and assessment
- Current benefits for learners
- Examining the evidence
- Learners' experiences and outcomes
- Reflecting on current practice
- Promising areas for development

Large scale projects:

Blaisdell, Academic MP3's >> Is it iTunes yet?

- University of Michigan- School of Dentistry
- Duke University
- George College & State University, University of Dayton
- Stanford University
- Drexel University
- Virginia Tech
- Universite Lumiere Lyon
- Charles Sturt University, Australia
- Macquarie University, Australia
- Santa Clara University, University of Cincinnati

5.2 Potential Use

JISC Report: *Landscape Study in Wireless and Mobile Learning in the post-16 sector*, Potential Uses of Wireless and Mobile Learning, Diane Evans, The Open University

- Future needs and opportunities in post-16 education in learning and teaching
- Further Education
- Higher Education
- Lifelong Learning

5.2.1 Mobile and wireless technologies as a factor in e-assessment and e-portfolios

- What new models of learning are being promoted?
- Future learning requirements and paradigms
- Future developments targeted by existing research projects
- What are the mobile/wireless uses with the most potential for learners?

5.3 Strategic Use

JISC Report: *Landscape Study in Wireless and Mobile Learning in the post-16 sector*, Strategic Aspects of Wireless and Mobile Learning, John Traxler, University Of Wolverhampton

- Strategic Overview – Some Themes
- Projects

- Niches
- Institutional Perspectives
- Strategic Overview – Possible Trends

5.4 The use of mobile/handheld devices, audio/podcasts for teaching/learning purposes in HE

5.4.1 Provide core materials

Mobile/handheld devices, and audio/podcasts can be used to provide podcasting lectures and other reference materials. The advantages are:

- Students repeat the lectures anytime, anywhere
- Non-native English speaking students repeat the lectures
- Students who were quite severely dyslexic, or visual or hearing impairments
- Students review the lectures before exams
- Students listen to the lectures they have missed
- Students ruminate, and listen again to lectures and tutorials as a way of encouraging critical, analytical approaches
- Instructors listen to their own lectures to improve their presentations

5.4.2 Provide recordings of the entire lectures

Lecturers can offer both streaming & **podcasting lectures** (Purdue University). This function can be used to all subjects.

Stanford University provides faculty lectures via **podcasting**.

The University of Wales, Aberystwyth was the first university in the UK, using **podcasts**, where physics lecturer Andy Breen decided to introduce it as an experiment in September 2004. Initially, he recorded his own **course lectures** and uploaded them to the department's virtual learning environment (VLE).

5.4.3 Provide reference materials

Mobile devices can be used to access reference materials copied from lectures. These materials format existing content in a way which is consistent with its original design but is accessible on a mobile device (MOBILearn, MBA).

5.5 Provide additional course-related materials

Mobile/handheld devices, and audio/podcasts can be used to provide different kind of additional materials related to the course.

5.5.1 Provide podcasts on various topics related to the subject

Purdue University provides collections of **podcasts** on various topics related to different subjects.

University of Western Australia provides course-related **podcasts** materials (Communication Studies)

5.5.2 Produce/listen to authentic audio materials

Duke University provides recordings of textbook materials, journals, songs, music, vocabulary, novels, stories, poems, radio programs, **subscribed podcasts** distributed by media source, oral history interviews, authentic speeches by notable figures, congressional debates, etc. These listening materials can be widely used for subjects such as Foreign Languages, History, Politics, Writing, Arts, Music (Duke University).

In GCSU (Georgia College & State University), iPods allow students to listen to audio content on the web, **subscribed podcasts**, pre-loaded language tutorials, recordings of diction sessions with native speakers, audio books, literature, TV/radio newscasts, assigned selections of music, live recordings of rehearsals and concerts. These listening materials are used for various subjects: Education, Psychology, Music, History, Sociology, Foreign Languages (GCSU).

In University of Mary Washington, the professor reads poems through **podcasts** to help students overcome obstacles of language and syntax (University of Mary Washington, Foreign Languages).

Students can record lectures, teacher's notes, meeting and conference notes with teachers/students, student oral report, student project support interviews for different subjects (University of Missouri).

5.5.3 Provide preclass listening materials

Students listen to “Mini lectures” via **podcasting** before class containing contextualized information about the readings, collections of audio lectures, and questions posed by the lecturer for students to think about before class (Duke University, Philosophy).

Students listen to **podcasts** before class containing news of the week, activities students are expected to do, comments and feedback on assignments and E-tivities, and jokes (University of Leicester, Engineering).

Students use **podcasts** to explain what they hope to accomplish in their presentations, and read aloud brief excerpts from the assigned readings to help others understand easily (University of Mary Washington, Philosophy).

The professor use **podcasts** to summarize several journal articles related to the subject (University of Mary Washington, Biology).

Students listen to **podcasts** before class containing background materials of the subject and terminology used in the subject, e.g. computing jargon. The podcasts are used as a strategy for addressing students’ preconceptions and anxiety to better prepare them for effective face-to-face learning. They think of adding music to enhance preclass listening materials, using **podcasts** for revision and reinforcement purposes, and sharing **student-generated podcasts** for knowledge construction (Charles Sturt University, Computing Science).

Student-generated podcasts contain 2 or more students’ discussions on pertinent issues related to the subject matter (Charles Sturt University, Information Technology).

Students of Charles Sturt University thought that **podcasts** can be used to address their problems related to time management, how to follow the course content and take notes, fear of missing content, fear of not being about to talk to anyone, social aspects of the subject and assignment details and submission procedures (Charles Sturt University, Computing Science).

5.5.4 Access multimedia materials

With video enhanced iPod, students can access a visual glossary of human neuroanatomy. This glossary comprises 500 structures and terms. For each term, students can access a description of the term, information on brain structure, location and function, audio pronunciation, links to related terms and high quality brain images optimized for the iPod photo display (Duke University, Psychology).

With video enhanced iPod, students can access a visual glossary of the human brain and spinal cord. This resource contains information on more than 400 neuroanatomical structures and terms. Students use it for specific assignments and to facilitate the learning of human central nervous system anatomy. Students can also watch a brain dissection video via iPod (GCSU, Psychology).

With video enhanced iPod, students can view masterworks of world cinema, listen to music, view paintings and hear presentations at the same time (GCSU, Arts and History).

With video enhanced iPod, students can listen to assigned music while using the text notes function to learn about the social setting and political climate of the era of composition or read biographical information about composers and musicians (GCSU, Music and Dance).

Mobile devices can provide students with a series of interactive exercises based entirely around question and answer activities with supporting information and images (MOBILearn, First Aider in Health).

Mobile devices can provide users with different sets of information for different locations by using rich media (MOBILearn, Multimedia Museum).

Users can display the works and hear the information about the works, comments from the author and photographer (GCSU, Multimedia Exhibit).

Handheld devices such as PDAs allow Healthcare students to access a wide range of multimedia resources related to clinical information and tools e.g. administrative functions (scheduling, address book...), electronic textbooks, prescription information, medical calculators, photography, memo, medical records, patient tracking, etc. and learning activities and tools e.g. access Internet, dictation, evidence-based medicine tools, in-house documentation system, etc. (Healthcare in Community).

PDA's allow students to access course syllabus, online grade books (post student grade), personal profile (store information to share with others), team space (facilitate the collaborations among team members), video classroom (watch lectures live), etc. (Indiana University, for all subjects).

Access administrative information

Students use SMS messaging to access information about lectures and classes, and corrections in the schedule, etc. (for all subjects)

5.6 Produce student presentation, assignment and project

Handheld devices such as iPod can be used by students to store, transfer, import, archive and display photographs and large files for presentation and multimedia projects or assignments. This function can be used for various subjects: Arts, Writing, Politics, Computing Science, Information Science (Duke University).

Record student discussion sessions or tutoring sessions, and use **podcasts** to share comments and summaries to discussions (Duke University). This function can be used for various subjects, e.g. Education, Writing, Philosophy, Information Science, etc.

Students record their own conclusions based on interviews, record their summaries based on weekly group blogs, and make them available to others via **podcasts** (GCSU, Education and Psychology).

Students produce their own podcasts on various areas of historical research including biography, local history, oral history, etc (GCSU, History).

Students create **enhanced podcast presentations** on assigned readings (e.g. offering imaginative and innovative tour of places mentioned in the book) (GCSU, Arts).

Students produce their final project – composition (GCSU, Music and Dance).

5.7 Facilitate field studies

Mobile/Handheld devices can be use to facilitate student trip and field study.

5.7.1 Record interviews with field informants

Mobile/Handheld devices can be use to record student interviews with field informants. This function can be used for various subjects: Cultural Studies, Foreign Languages, Environmental Science, Arts, Writing (Duke University), Education (GCSU: Georgia College & State University).

PDA's allow students to record result of public opinions or investigations in local community (Sociology).

5.7.2 Record field notes and personal observations

PDA's allow students to capture data during care of the patient. They allow data to be aggregated for decision-making (Columbia University, Medical)

Handheld devices such as PDA's allow amateur naturalists or students learning science to keep track of their observations.

5.7.3 Access preloaded information related to the field study/trip

PDA's with preloaded information such as field guide and note books allow students to refer to during their trip or field study (Biology, Ecotourism Management)

PDA's with preloaded materials relevant to a particular exhibit help students to learn more during a museum trip (Science)

5.7.4 Access database and compare data collected

Handheld devices such as PDA's provide amateur naturalists or students learning science the ability to connect with a database and compare their data.

5.8 Evaluation (tutor evaluation, peer evaluation, self-evaluation)

Handheld devices such as iPod can be used by students to record their own reading, presentation, speaking assignment, oral examination, group discussion for tutor evaluation, peer evaluation or self-evaluation. This

function can be used for different subjects: Foreign Languages, Oral Communication, Academic Presentations, Writing (Duke University).

With enhanced video iPod, students can view their taped conducting performances for self-evaluation (GCSU, Music and Dance).

Students produce their **podcast assignments** for assessment (University of Western Australia, Communication Studies).

Students record interviews with each other (in **podcasts**) using foreign languages for peer evaluation or self-evaluation (University of Mary Washington, Foreign Languages).

PDA's allow supervisors to conduct onsite student assessment, record information about students and create lesson plans (Columbia University, Teacher Education).

Students record and upload their foreign language lessons in **podcasts format** to their instructor's website so their instructor can listen and give evaluation (University of Missouri, Foreign Languages).

5.9 Access practical exercises

Mobile phones with online services allow students to access multiple choice questions and answers, and practical exercises for TOEIC (Test of English for International Communication) (Foreign Languages).

Mobile devices allow students to review, listen and practice speaking, and provide services such as phrase translation, quizzes and live coaching (Stanford Learning Lab, Foreign Languages).

5.10 Provide feedback on student work/questions

Handheld devices such as iPod can be used by tutors to record feedback on student assessment such as oral exams (Duke University, Foreign Languages).

iPod allows lecturers to provide **weekly podcasts based on "muddy points"** students posed via email (GCSU, Psychology).

5.11 The use of mobile/handheld devices, audio/podcasts for other purposes in HE

5.11.1 Support student social life

Podcasts can be used to provide and distribute information on various aspects of student social life. For example, Purdue University provides **podcasts** on all kinds of information related to student social life.

5.11.2 Career Centre

Produce **podcasts** based on other people's career stories (GCSU)

5.11.3 Entertainment

Provide entertaining materials such as music and sports (Stanford University)

Distribute sport events (University of Missouri)

5.11.4 Information within a community

Provide advising content for Stanford community (Stanford University)

Distribute news broadcasts (University of Missouri)

Distribute bus schedule and weather report (Indiana University).

5.11.5 Campus orientation

Students of Charles Sturt University thought that **podcasts** can be used as campus orientation to first year students.

5.11.6 Prepare international students for living/studying in the UK

Podcasts are used as part of "the Arrive UK" toolkit for international students. The podcasts are based on different themes such as travel stories and experiences, and tutors' tips concerning specific academic skills e.g.

the best ways to approach academic reading and note-taking. The e-tutor sets various listening comprehension tasks in relation to the podcasts and these also formed the starting point for a number of the discussion board activities (University of Southampton).

5.12 Staff development/training

Handheld devices such as iPod can be used by lecturers/tutors to record student experience with the lecturer/tutor, record lecturer/tutor's reflection on their own work, record selected sessions, students' brainstorming discussion, and their own sessions for training and reflection purposes (Duke University).

Staff develop **podcasts** on various topics such as assessment, how to promote discussion in the classroom, teaching with technology, gender and cross-cultural issues in the classroom, scholarship, book reviews, teaching/learning resources, etc. for staff development and training purposes (GCSU).

Podcasts can be used to produce content such as how to use CETL resources for new staff (GCSU).

Staff produce **podcasts** based on an open discussion on selected articles from various disciplines (GCSU).

5.13 Student recruitment

The University produces **podcasts** providing information to prospective students (GCSU).

Audio/video (podcasting/vodcasting) can be used to provide recruiting brochures with personalized messages for prospective students and parents (University of Missouri).

Reference:

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