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A Context for the Development of Learning Outcomes in Museums, Libraries and Archives

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1.0 Introduction

The Research Centre for Museums and Galleries in the Department of Museum Studies at the University of Leicester was commissioned by Resource: the Council for Museums, Archives and Libraries to research ways of defining and assessing the learning outcomes in museums, archives and libraries (the three domains). This project is one element of the Inspiring Learning Framework[1] that Resource is developing.

This paper describes our study of different approaches to, and definitions of, learning outcomes[2] that have been used both in formal education and open learning environments such as the three domains. The study involved an extensive literature review on learning outcomes, and a series of consultations with learning theorists and practitioners. We also tested our initial ideas and assumptions about learning outcomes by carrying out a small-scale Museums, Archives and Libraries User Study[3]. In total, 30 adult users were interviewed in ten locations (see Appendix B) between 26 November and 7 December 2001.

This paper is intended to provide the context for the development of generic learning outcomes that can be used in all three domains in the next phase of this project. Having developed an appropriate set of generic learning outcomes, we will develop specific research tools for assessing these outcomes. These will include both qualitative and quantitative methods, examples of which are presented in the final section of this paper.

As this is a working paper, we expect it to be modified and enriched by further learning studies being carried out in museums, archives and libraries. It is also the first of a series of papers to be produced by the

[1] A copy of the Inspiring Learning Framework paper can be found on the Resource website at: www.resource.gov.uk.
[2] The term 'learning outcomes' does not refer to processes - for example delivering programmes for specific groups of learners - but to measurable outcomes on individual users – that is, the result of individuals using the services offered by museums, archives and libraries.
[3] For more information on the different types of research carried out see Appendix B.

Learning Impact Research Project team that will include an paper on the conceptual framework[4] used in this study.

[4] This paper, written by Eilean Hooper-Greenhill, is also available through Resource.

2.0 Learning outcomes in formal education

In the context of formal education, learning outcomes can be defined as: 'Specific measurable achievements. These are similar to (programme) objectives but described in terms of what the learners will be able to do.'[5] The outcomes are student-centred, measurable, achievable, and can therefore be assessed.

Learning outcomes are generally developed in relation to specific programmes of study or schemes of work in formal education. In universities, for example, programme specifications and module outlines must include an explicit statement of intended learning outcomes linked to assessment criteria for judging student achievement in respect of these outcomes. Lecturers write the learning outcomes and judge individual student achievement against them. Learning outcomes are written with the National Qualifications Framework in mind; this is based on five levels of student achievement from a Higher Education Certificate at level 1 to doctoral level work at level 5. Aims and outcomes are written in respect of knowledge and understanding, and skills and attributes, upon completion of the course of study.

Learning outcomes are expressed in terms of 'can do' verbs. Those recommended include precise and focused verbs such as: compile, plan, analyse, select, apply, demonstrate, assess, reflect, enumerate, combine, and contrast. 'Can do' verbs considered too open to be useful in the context of higher education are: know, become aware, appreciate, understand, enjoy, and learn. Outcomes are usually related to desired changes in learners' behaviour, an approach that can be used within formal learning contexts where specific learning objectives can be established.

While learning outcomes may be learner-centred, there is no suggestion that learners in formal education might write their own learning outcomes.

[5] From course notes, Writing Learning Outcomes, University of Leicester Postgraduate Certificate in Academic Practice I HE; from Lin Throley et al, *Guidance on Learning Outcomes*, University of Hertfordshire. For more definitions of learning outcomes, see Appendix A.

This is seen as the teachers' responsibility as part of effective course design. Teachers devise learning outcomes in relation to a base-line (what students know at the beginning of a programme of study) and assess their students' performance at the end of the programme (have students achieved the desired outcomes?). Use of this approach – known as base-line assessment – is a statutory requirement for all early-years educators in the UK[6]. By assigning numerical levels to children's achievements, schools can set targets which they are then expected to meet. This is a rather mechanistic way of describing and assessing learning and its outcomes.

It has been argued that the material made available to learners in any learning environment should also be used to determine what kind of learning outcomes are set and how they are assessed (Hoodless 1998). This is particularly challenging in informal settings for learning with very variable availability of resources and material. The setting of learning outcomes in informal and open learning environments[7] is also problematic if there are no study programmes, established learning objectives, or specific target dates for achieving outcomes, and no formal assessment process to which users are subjected. Compared with formal education, learning in museums, archives and libraries tends to be wider-ranging, more self-selected and self-directed, more open, less likely to follow a linear path, and more likely to link to other social experiences and be a group activity.

The implications of these differences for evaluation of learning outcomes outside formal education are a need to put the emphasis on: assessing outcomes that are measurable and can be assessed at critical points in learners' development; giving learners control over assessing learning outcomes that they themselves have set (self-assessment) which could increase their motivation; and being able to accept that learning outcomes may vary greatly for different learners within the same learning context.

[6] For more information on approaches to assessment in the primary school see Conner, C. (ed) 1999, *Assessment in Action in the Primary School*, Primary Directions Series, Falmer Press, London.
[7] The term is used here to refer to those environments where learning is accessible, flexible and with learners in control.

3.0 History of learning outcomes and theories of learning

Efforts to classify learning outcomes in the form of taxonomies date back to the 1950s with the publication of Taxonomy of Educational Objectives by Bloom and a group of educational psychologists (Bloom et al 1956, Krathwohl et al 1964). Their efforts were followed by Gagne's taxonomy (1985, Gagne and Briggs 1979). More recently, alternative ways have been developed of studying learning and its outcomes through the application of intelligence theory (Gardner 1983, Sternberg 1997) or the concepts of interest and motivation (Csikszentmihalyi and Hermanson 1995). The two latter approaches take a different theoretical stance and use different terminology to describe learning processes.

This section demonstrates that, although the concept of learning outcomes is helpful in terms of the didactic and behaviourist approach, it is problematic in relation to constructivism. As we will see in section 4, which refers specifically to learning in museums, archives and libraries, it becomes even more problematic when there is no structured system of teaching.

3.1 What is a learning outcome?

The taxonomy developed by Bloom, Engelhart, Furst, Hill and Krathwohl (1956) includes three overlapping domains: cognitive, affective and psychomotor. Cognitive learning is demonstrated by knowledge recall and intellectual skills. Bloom et al (1956) identified six levels or categories ranging from simple levels (ie, recall and recognition of facts) to more complex and abstract mental levels (ie, evaluation). The six levels are: 1) knowledge, 2) comprehension, 3) application, 4) analysis, 5) synthesis and 6) evaluation (table 1). The affective domain, which relates to emotions, attitudes, appreciations and values, has five categories: 1) receiving, 2) responding, 3) valuing, 4) organisation, and 5) characterisation. Psychomotor learning is demonstrated by physical skills (including fine and gross motor skills) (Krathwohl, Bloom and Masia 1964).

CAN BE ACHIEVED THROUGH SURFACE LEARNING		REQUIRES DEEP LEARNING			
					6. Evaluation
				5. Synthesis	Judge
			4. Analysis	Compose	Appraise
	2. Comprehension	**3. Application**	Distinguish	Plan	Evaluate
	Translate	Interpret	Analyse	Propose	Rate
1. Knowledge	Restate	Apply	Differentiate	Design	Compare
Define	Discuss	Employ	Appraise	Formulate	Revise
Repeat	Describe	Use	Calculate	Arrange	Assess
Record	Explain	Demonstrate	Experiment	Assemble	Estimate
List	Express	Dramatise	Test	Collect	
Recall	Identify	Practice	Compare	Construct	
Name	Locate	Illustrate	Contrast	Create	
Relate	Report	Operate	Criticise	Set up	
Underline	Review	Schedule	Inspect	Organise	
	Tell	Sketch	Debate	Manage	
		Question	Prepare		
			Relate		
			Solve		
			Examine		
			Categorise		

Table 1. Relation of Bloom's classification of educational objectives to surface and deep learning (Bloom et al 1956).

Gagne (1985) provided a classification of learning outcomes or 'human capabilities' similar to those developed by Bloom et al (1956) and Krathwohl et al (1964). He identified five categories of learning outcomes[8]: 1) intellectual skills, 2) cognitive strategies[9], 3) verbal information, 4) motor skills, and 5) attitudes[10]. According to Gagne and Briggs (1979: 49), intellectual skills are particularly important as 'they make up the most basic, and at the same time the most pervasive, structure of formal education'. They identified several sub-categories of intellectual skills: discriminations, concrete and defined concepts, rules and higher-order rules often learnt by problem-solving (figure 1).

Gagne (1985, Gagne and Briggs 1979) used these learning outcomes as a framework for designing instructional systems that would provide the means for achieving all learning outcomes set by the curriculum. He believed in the importance of designing instruction to meet educational goals that are related to human capabilities which, in turn, are derived from societal needs.

Fitz-Gibbon and Kochan (2000) adopted the approach of 'considering the desired sequence of events in the education of a child' in order to identify the outcomes that emerge from this desired sequence of events. This approach highlights the fact that the choice of specific outcome indicators is driven by what is valued. Fitz-Gibbon and Kochan (2000:262) identified five outcome indicators:

- 'flow/production: student numbers'
- 'quality of life: intrinsic values'
- 'affective domain (student attitudes)'
- 'behavioural domain including skills'
- 'cognitive domain: aptitudes and achievements'

[8] The first three: 1) intellectual skills, 2) cognitive strategies and 3) verbal information are part of Bloom's (1956) cognitive domain.
[9] The term refers to capabilities that control the learner's own learning, remembering and thinking behaviours.
[10] Often mentioned as affective domain, see Krathwohl (1964).

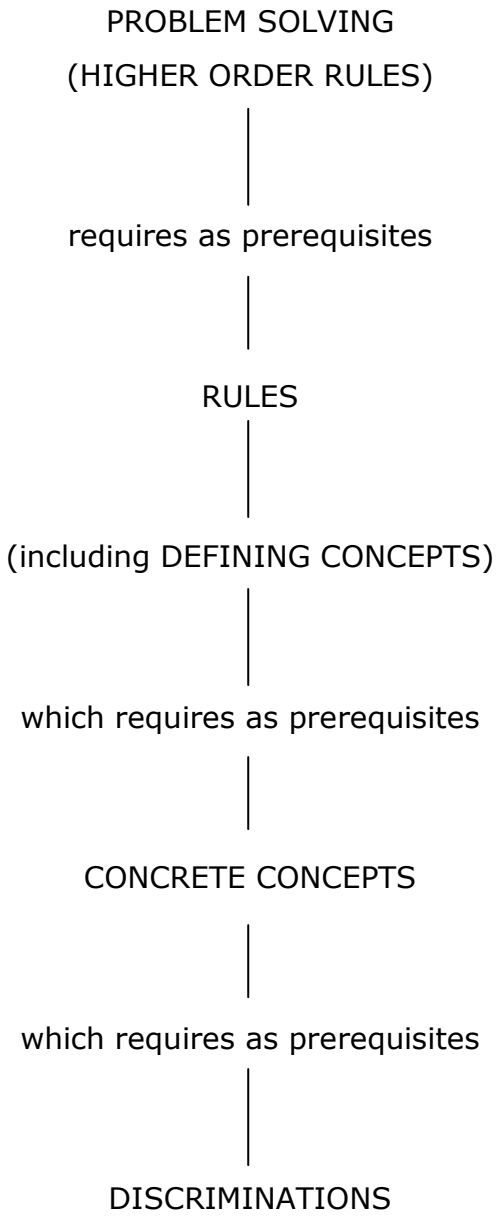

Figure 1. Levels of complexity of intellectual skills after Gagne and Briggs (1979: 62).

More recent attempts to research and define the outcomes of an educational experience reflect a different approach and terminology. Hence, Claxton (1999) takes a broader view of learning and its outcomes, especially outcomes that people achieve in adulthood, by focusing on how societies and organisations can help everyone fully develop their learning powers. He believes that intellectual learning is only one type of learning — and historically the most recent; other types include practical or know-how learning. Some of the things we learn throughout our lives include:

1. To accumulate information or knowledge on which we base our opinions
2. To be discriminating
3. To develop preferences and dispositions
4. The adoption of new roles
5. Development of new aspects of our character
6. To broaden our emotional range, and how and when to express particular feelings
7. How to learn
8. To learn in different ways (by immersing one's self in an experience, by using one's imagination and intuition) and practising both old and new learning modes
9. When, how and where to apply one's learning strategies
10. That learning power is a 'joint function of the inner and outer resources': that is, learning to use both internalised knowledge and know-how as well as the cultural tools and resources available
11. To develop self-knowledge and self-awareness
12. The ability to take risks: this involves knowing when, and when not, to take risks and the ability to tolerate the emotions integral to learning
13. That learning takes time
14. That learning power develops through culture not through instruction
15. That one's own attitudes to, and belief in, learning strengthen one's learning power.

An interesting approach to understanding lifelong learning is through the concept of intelligence. According to Sternberg (1997:1030): 'Intelligence comprises all the mental abilities necessary for adaptation to, as well as shaping and selection of, any environmental context.' Hence, intelligence is used to adapt, but also actively form, the environment. As environments change over time, so does people's ability to adapt, select and shape them. Although intelligence is relevant to any environmental context, what is considered to be intelligent behaviour differs, and the content and process of learning may therefore differ from one environment to another. But Sternberg (1997) argues that, although the mental processes are the same in any environmental context, the same processes may lead to different behaviours in different environmental contexts. The difference in intelligent behaviours depends not only on the environment but also on the ability, motivation and decisions of the people in any given environment to apply these mental processes. Sternberg (1997:1031) has identified a set of abilities necessary for adaptation, shaping and selection in any environmental context:

1. Recognising the existence of a problem
2. Defining the nature of a problem
3. Constructing a strategy to solve the problem
4. Mentally representing information about the problem
5. Allocating mental resources in solving the problem
6. Monitoring one's solution to the problem
7. Evaluating one's solution to the problem.

Sternberg also distinguishes between mental abilities necessary for contextual adaptation and other abilities that are useful only for adaptation. The latter include emotional intelligence (Goleman 1995); abilities such as musical and kineasthetic intelligence (Gardner 1983); practical intelligence (Sternberg, Wegner and Okagaki 1993); creative intelligence (Lubart and Sternberg 1995), social intelligence which includes the use of knowledge, beliefs and skills to negotiate social interactions (Centor and Kihlstrom 1987) as well as the use of (verbal and non-verbal) communicational skills (Sternberg and Smith 1985); and

academic intelligence (Hernstein and Murray 1994, Hunt 1995). However, to perform well in any job, people need creative and practical, as well as analytical, skills.

The need for analytical, creative and practical skills was supported by research (Sternberg 1993) carried out with high school students in the USA. The study involved assessing the students' analytical, creative and practical abilities (Triarchic Abilities Test); assigning them to introductory psychology class that emphasised one of these abilities; and then evaluating the analytical, creative and practical abilities of all the students again. The analysis showed that: 1) students who attended a course that matched their abilities performed significantly better than did those who did not; 2) when considering the three abilities together, students' performance was significantly improved; and 3) students from ethnically and socio-economically diverse backgrounds scored higher in creative or practical activities. Sternberg (1997:1036) summarises this as follows:

> 'when students learn in a way that lets them capitalize on their strengths as well as compensate for and remediate weaknesses, they perform better than when they are taught in standard ways. The proposed diversification of instruction as well as assessment means that students need to adapt to instruction that it is not compatible with their profile of abilities, but they also can shape their learning environments to best capitalize on the strengths in their ability profiles. Moreover, all students potentially learn better when they are able to multiply encode subject matter taught to them in a variety of ways.'

Sternberg's work implies a need for many changes in the way we define and assess learning and its outcomes, in methods of instruction, and in the development of learning activities to foster life long learning within any environment — and, in particular, the contemporary multicultural context in the UK. A more open system is needed within which a broader range of abilities will be valued and access routes provided to educational, social and economic opportunities.

Describing, researching, and providing opportunities for learning has become ever more important for modern societies in which the ability to learn throughout one's life is so important. In an effort to better understand the fast-changing patterns in 21st century learning provision, the Centre for Educational Research and Innovation organised a conference entitled *Learning Beyond Schooling – New Forms of Supply and New Demands,* held at the Paris headquarters of the Organisation for Economic Co-Operation and Development[11] (OECD) in 1994 (OECD Documents 1995). In the context of lifelong learning, adult learners were seen as setting their own learning objectives 'linked to character or intellectual development or to specific work-related competences' (OECD Documents 1995:12). Learning objectives that adult learners set for themselves may also relate to tangible factors and are often limited by time constraints. Conference participants questioned the arbitrary distinction drawn between learning for 'investment' (learning as an instrument for enhancing the economic capacity of an individual) and learning for 'consumption' (as a means of enhancing quality of life) (p17). Instead, they argued that people are motivated to learn for a multiplicity of reasons.

3.2 Theories of learning

To better understand learning outcomes, we need to look at the different approaches to learning from which the concept of learning outcomes is derived. We will also examine more recent approaches that move away from the idea of learning outcomes and seem to be more appropriate for the needs of open learning environments.

As one of the most critical thought processes, learning has traditionally been studied as an aspect of psychology. Although there have been a number of attempts to define learning, definitions are more often in the form of distinctions between different types or styles of learning.

[11] The member countries of OECD are: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, the United Kingdom, the United States. The Commission of the European Communities also takes part in the work of OECD.

The focus of different learning theories varies according to the assumptions about the nature of knowledge and learning on which they are based. The two dominant theories of learning in psychology are behaviourism, and, since the mid-20th century, cognitive theory. In the past decade, however, new approaches to learning have been recognised: constructivism, which is a psychological theory, and social theories of learning[12] which bridge psychology and anthropology by introducing social interaction into the understanding of learning.

Behavioural psychologists believe that learning is brought about by conditioning (behaviourism[13]) or observing a model (social or observational learning[14]). Cognitive psychologists, on the other hand, focus on internal cognitive structures and view learning as transformations in these internal structures (cognitive-developmental theories[15] and information-processing theories[16]). Constructivist learning theories focus on 'the process by which learners build their own mental structures when interacting with the environment' (Wenger 1998: 279). Other theories that have moved away from a purely psychological approach 'focus on bridging the gap between the historical state of an activity and the developmental stage of a person with respect to that activity' (activity theories[17]) (Wenger 1998: 280); or study the relationship between people, physical objects and cultural communities (social theory of learning) (Lave and Wenger 1991, Wenger 1998); hence the focus of the latter theories on learning as social participation.

[12] Which according to Wenger (1998: 11-15) have traditionally been influences by intellectual traditions such as theories of social structure, situated learning theories, theories of identity and theories of practice.
[13] Behavioural psychologists view learning as a 'relatively permanent change in behavior that result from practice or experience' (Vasta, Haith and Miller 1992:35)
[14] This approach comes from the behaviourist tradition and is based on Bandura's work (Vasta, Haith and Miller 1992).
[15] Where development and learning is viewed as the interplay between biological maturation (the functions that construct internal cognitive structures) and experience (the psychological structures or schemes that are built as a result of a person's interactions with the world) (Roschelle 1995, Vasta, Haith and Miller 1992).
[16] See Roschelle 1995: 46-47 and chapter nine in Vasta, Haith and Miller (1992).
[17] Vygotsky's pedagogical theory, see Moll (1995).

These perspectives have defined what we perceive as learning, where we recognise learning, and how we act on it. It is therefore important to know what our perspective is and reflect on it before we design for the outcomes of learning in any learning environment.

The following sub-sections present some definitions of learning, based on a cognitive and/or socio-cultural perspective, that are appropriate to the study of learning occurring in open learning environments.

3.2.1 Definitions of learning

> 'Learning is a process of active engagement with experience. It is what people do when they want to make sense of the world. It may involve increase in skills, knowledge, understanding, values, feelings, attitudes and capacity to reflect. Effective learning leads to change, development and the desire to learn more.' (Campaign for Learning).

> 'Learning is an active process in which the learner uses sensory input and constructs meaning out of it. […] People learn to learn as they learn: learning consists both of constructing meaning and constructing systems of meaning. […] The crucial action of constructing meaning is mental: it happens in the mind. Physical actions, hands-on experience may be necessary for learning, especially for children, but it is not sufficient; we need to provide activities which engage the mind as well as the hands […] Learning involves language: the language we use influences learning. […] Learning is a social activity: our learning is intimately associated with our connection with other human beings, our teachers, our peers, our family as well as casual acquaintances, including the people before us or next to us at the exhibit. […] Learning is contextual: we do not learn isolated facts and theories in some abstract ethereal land of the mind separate from the rest of our lives; we learn in relation to what else we know, what we believe, our prejudices and our fears. […] One needs

> knowledge to learn: it is not possible to assimilate new knowledge without having some structure developed from previous knowledge to build on. […] It takes time to learn: learning is not instantaneous. […] Motivation is a key component in learning.' (Hein 1991:90-91).

Etienne Wenger (1998: 226-228) sees learning as a process of engaging in social practice and that can be applied in all kind of settings. This social perspective on learning may be summarized succinctly by the following principles:

- Learning is inherent in human nature
- Learning is first and foremost the ability to negotiate new meanings
- Learning creates emergent structures
- Learning is fundamentally experiential and fundamentally social
- Learning transforms our identities
- Learning constitutes trajectories of participation
- Learning means dealing with boundaries
- Learning is a matter of social energy and power
- Learning is a matter of engagement
- Learning is a matter of imagination
- Learning is a matter of alignment
- Learning involves an interplay between the local and the global.

Claxton (1999) distinguishes four main learning strategies that comprise 'the good learner's toolkit':

- Immersion in experience: exploration, investigation, experimentation, social interaction and imitation
- Imagination: fantasy, visualisation, storytelling to create and explore hypothetical worlds
- Intuition: creativity, germination of ideas

- Intellect: language, reasoning, analysis, communication.

3.3 Summary

The concept of learning outcomes seems to be an important aspect of the development of systems of instruction and evaluation of learning occurring in formal learning environments. Outcomes provide a way of describing the messages learners are supposed to have learned through instruction. They also provide a way of researching learning. More recently, attempts have been made to devise different approaches to describing and investigating learning. These focus on learners' experience and provide a way of looking at learning as a holistic experience in which the learners play a much more active role in defining and controlling their own learning. Within this context, the setting and assessment of learning outcomes based on assumptions about learners' needs are not relevant. The challenge is to find ways of involving learners in defining their own learning needs and assessing their own development.

4.0 Learning outcomes and open learning environments

In preceding sections we have looked at different approaches to learning and its outcomes. In this section we examine how these approaches have influenced the way learning is defined and assessed in the three domains. Three sub-sections on learning and its outcomes in relation to museums, archives and libraries each start with a summary to set the context, followed by a brief commentary on the history of learning outcomes in each domain, and a description of the current situation. Each sub-section also includes relevant findings from the Museums, Archives and Libraries User Study conducted by the Learning Impact Research Project team. A concluding summary draws together the main points from the discussion in each sub-section.

This section is intended to provide a snapshot rather than a comprehensive account of the research into learning carried out so far in museums, archives and libraries. We are aware that there are studies we did not have time to review or include in this report. However, as already explained, this is a working paper which we intend to amend and improve as the project progresses.

4.1 Museums

Museums[18] are perceived, above all, to be educational organisations by many museum practitioners and visitors. Motivational studies carried out in the past ten years have demonstrated that most visitors go to museums to learn (Macdonald 1993; Moussouri 1997a, [in press]; Falk et al 1998; Ellenbogen 2001). These studies have also shown that visitors do not see learning and entertainment as mutually exclusive — entertainment is as much a motivation as learning. Studies also suggest a close relationship between strong motivation to learn and/or be entertained and the occurrence of learning.

[18] This is a generic term which refers to different kinds of organisations including art, natural history and social history museums, archaeology museums and site, science and technology museums and centres, botanical gardens, aquaria, parks and children's and youth museums.

Similar findings were obtained from that part of the Museums, Archives and Libraries User Study conducted in museums[19]. A large majority of the people interviewed said that learning was their main motivation for visiting museums in general, and the particular museum they visited on the day of the interview. There is some evidence that a museum visit was an identity-based experience for a many visitors — they visited for a particular reason related to a course of study, a hobby, or work, had a specific or focused plan for their visit, and were also regular museum and library users.

The following sub-sections (4.1.1 and 4.1.2) review research studies into learning and learning outcomes, mainly carried out in museums in the UK. It is important to note that not all the studies assess the value of their users' experience in terms of learning outcomes.

4.1.1 History of learning outcomes in museums

The Natural History Museum in London was among the first museums in the UK to use psychological and educational research findings to guide the development of exhibits, starting with the *Human Biology* exhibition in the 1970s. The museum's exhibition development team aimed to provide conditions that facilitate 'learning', based on a mixture of didactic and behavioural approaches to learning (Miles et al 2001). Conditions that facilitate learning are those that take into account visitors' psychological and learning needs as they were perceived by the exhibition development team and included: stress-free situations where visitors were in a 'pure play mode'; giving visitors control over novel situations; building on visitors' motivations to visit and their past experiences; keeping visitors motivated by ensuring the exhibition is made personally relevant and rewarding; challenging 'misconceptions' about the subject matter of an exhibition; presenting the subject matter in a structured way (presenting one fact after another in an expert-led manner) and establishing 'whole-to-part' relationships; assessing the suitability of specific teaching

[19] Interviews were conducted at Horniman Museum in London, Abbey House Museum and City Art Gallery in Leeds and Buxton Museum and Art Gallery. In total, 14 interviews were completed.

material and approaches for the target audience; carefully considering the sequence and the format in which the material was presented; and setting behavioural objectives for the exhibition and evaluating its success against these objectives[20]. All of the above imply, according to Miles et al (2001), taking into account that learners needed to know 'what is going on' so that they 'want to do it' and to provide them with opportunities to try 'doing it'.

This approach was based largely on assumptions made by the exhibition development team members about visitors' learning needs. Although their assumptions were tested against actual visitors' needs during exhibit evaluation, visitor learning was still measured against predetermined categories derived from didactic and behavioural theories of learning.

4.1.2 The current situation in the UK

More recently, researchers have attempted to capture visitors' learning experiences using ideas derived from different theories. Some researchers have used the concept of learning outcomes to measure the learning that takes place as a result of a museum visit — the first and second examples (see below) fall into this category. Others have made a conscious effort to avoid using learning outcomes as a conceptual tool and, instead, approached learning from the visitors' perspective; examples in this category (see below) include the evaluation of the Education Challenge Fund and evaluation studies carried out by the Tate and the Victoria and Albert Museum.

The Science Museum has responded to Resource's intention to introduce a more standardised approach to the definition and assessment of learning in museums, archives and libraries by developing a set of indicators of potential learning for assessing the educational value of exhibitions, programmes, outreach material and web-based resources (Ben Gammon,

[20] Although it is acknowledged that setting behavioural objectives does not guarantee that the learners will learn what they were supposed to learn, the authors believe that, in the context of an exhibition, it is impossible to help visitors become 'error-sensitive'. Hence, it is again up to the exhibit development team to 'minimise the likelihood of visitors misunderstanding' (Miles et al 2001:33)

personal communication). The indicators, based on the work of Minda Borun, George Hein, Michael Alt and Nicky Hayes, cover five categories of museum educational experience: cognitive, affective, social, development of mental or physical skills, and personal (a museum educational experience may fit into one or more of the categories). The categories are used by the museum's staff[21] for defining exhibit aims and learning outcomes at the beginning of new projects, and to evaluate whether these, or any additional learning outcomes, have been achieved. The museum has also produced a list of barriers to learning which includes physical, intellectual and motivational barriers (Gammon 2001).

A research study of science galleries in the UK (Pontin 2002) showed that types of learning vary according to the age, interests and prior knowledge of visitors. The research, based on observation, interview, and visitor cards, suggests that learning outcomes are related to what visitors bring with them, as well as what is available to them on their visit. These factors include:

- Touching, handling and talking about the activities and resources provided
- Making personal associations
- Developing and applying skills — such as observation, comparison, inference, identification, classification, prediction, asking questions, hypothesising and testing — within a scientific context
- Developing practical skills such as using tools (mechanical and computer interactives as well as objects) to complete an activity
- Affective experiences
- Acquiring new knowledge building on existing knowledge
- Learning within a social context.

The researcher (Pontin 2002) concluded that most of the learning that occurred was related to developing and/or practising skills.

[21] This started with the development of the Wellcome Wing project which opened to the public in June 2000 (Bishop, Tatsopoulou, Gammon 2001).

The studies described below are based on a different approach to assessing visitor learning in museums and galleries. Although they do not use the concept of learning outcomes, they provide useful models for describing learning and its outcomes. An evaluation study (Hooper-Greenhill and Dodd 2001) of the impact of the Education Challenge Fund[22] on museum and gallery users identified several ways in which museums and galleries can enhance the quality of visitors' experience. These include giving visitors the opportunity to:

- Develop skills (through using computer software and hardware, or undertaking curatorial and historical research)
- Increase their employability.

Museums may also make an impact on visitors' identities as well as their attitudes, feelings and perceptions, for example by:

- Making them aware of museums and galleries
- Empowering them with a sense of cultural ownership
- Providing identity-based experiences
- Challenging their ideas about the potential of museums to represent different cultures
- Increasing their confidence, self-awareness and self-esteem.

The Tate carried out an interesting study of how 'pick up-and-do' activities for families enhance learning among family members (Cox et al 2000). Although the report does not specifically refer to or assess learning outcomes, the study showed that learning experiences promoted by taking part in the activities included:

- Parents listening to their children's thoughts
- Family members discovering new information

[22] The Fund, introduced by the Department for Culture, Media and Sport (DCMS), was managed by Resource and used by the Area Museum Councils. The focus was on professional development, particularly, in the fields of education, access, audience development and lifelong learning. The Research Centre for Museums and Galleries at the University of Leicester evaluated the Fund (Hooper-Greenhill and Dodd 2001).

- Family members being encouraged to look at the art in new ways
- Family members feeling happy and proud as a result of completing the activities.

The study showed that families with a learning agenda had specifically planned to visit one of the Tate's four sites, or had been to the same site before. But families also liked the fact that 'learning' was only one option and did not preclude them from having other types of experiences. Taking part in the activities enhanced their:

- Understanding of the concepts or ideas related to the content of each activity
- Ability to recall particular art works
- Ability to develop of skills related to observing, thinking, discussing about art and which they could apply elsewhere
- Ability to appreciate art.

The findings also showed that the more visitors were excited by the activities, the stronger were their responses to them, and revealed that barriers preventing visitors from having a positive learning experience included:

- Their being confused by the written instructions for activities
- Being frustrated by the language used for instructions and flaws in the design of activities
- Finding the length of the activities tiring.

At the Victoria and Albert Museum, the planning of the British Galleries (Hinton 1999) marked the start of a different approach to facilitating and assessing learning based on matching users' learning styles to preferred types of interpretation. Learning styles include: diverger (learning from concrete experience and reflective observation); assimilator (learning by thinking and reflective observation); converger (learning by thinking and active experimentation); accommodator (learning from concrete experience and active experimentation); and mixed learning styles.

A final example is the work carried out by the Institute for Museum and Library Services (IMLS) in the USA that relates directly to the idea of measuring learning outcomes. Much basic and applied research has been carried out in the USA over the past 20 years in an effort to understand, document, and assess learning and its outcomes in informal learning environments[23]. During the past ten to 15 years, museums, libraries and other related organisations have been asked to demonstrate their value and justify the money spent on different activities. To help the sector do this more effectively, the IMLS has introduced a process of 'outcome evaluation' for the programmes it funds. The process, the focus of which is on measuring outcomes (defined as the effect of an institution's activities and services on the people it serves) rather than on the services themselves (outputs), may prove to be a keystone of future library and museum programmes[24]. The definition of outcomes used by the IMLS refers to 'achievements or changes in skill, knowledge, attitude, behaviour, condition, or life status' (IMLS 2001).

4.1.3 Summary

Our literature review showed that many learning research studies have been carried out on learning in museums. Although there are still gaps, we now have a good understanding of who visits museums, who they visit with, when and how often they visit, why they visit, how they remember their visit, and what impact museum visits make on visitors' lives. Yet, few studies provide a definition of learning or state clearly which theoretical approach was used to investigate learning. In many cases, the theoretical framework – used consciously or unconsciously — was didactic and behavioural in practice.

Many researchers also use the concept of learning outcomes in different ways in order to describe, understand and investigate learning in and from

[23] Most of these studies have been – and are still being – carried out in science museums and centres. For more information see Hooper-Greenhill and Moussouri (2002).
[24] More information, recourses and bibliography can be found on-line at: http://www.imls.gov/grants/current/crnt_obe.htm

museums. In fact, most of the evaluation studies and many of the basic research studies carried out in the UK and North America are learning impact studies, most of them in science museums and science centres. However, more recent studies using a constructivist or a socio-cultural perspective have allowed us to view learning as a more complex phenomenon, and advanced our understanding of learning in open learning environments. They have provided examples of potential individual and social learning experiences previously ignored in behavioural studies.

4.2 Libraries

Like museums and archives, libraries provide a wide range of services. Many play an integral part in learning by individuals and organisations. Whatever the political origins of public libraries, it is clear that they fulfil a vital function in both formal and informal learning, especially through their work with young children and older people. School and academic libraries have a key role in the learning process, as do health service libraries through their provision of information and support for patients, hospital staff and teaching hospitals. At the same time, national libraries are changing from being primarily acquirers and keepers of material to becoming interactive, socially-responsible organisations with a wider role in the learning process than suppliers of material to visiting students and researchers. While the commercial sector may seem less relevant, the increasing emphasis on learning in the workplace and continuing professional development, will make their role in workers' learning more important.

Over the past decade, libraries have been asked to do more surveys of users to provide a means of measuring and comparing their performance[25]. The focus of these studies has been on measuring outputs (book issues and inquiries) rather than on the impact of services on individuals and communities[26]. More recently, a number of studies have been carried out looking at the impact of library services on users, mainly in school and public libraries, while a few studies focus in learning impact. This change of focus can be explained, according to Williams and Wavell

[25] For example, the Library & Information Statistics Unity at Loughborough University publishes library statistics on a regular bases. For more information and resources available to download, visit LISU web site: www.lboro.ac.uk/departments/dis/lisu/lisuhp.html.

[26] The need for more learning impact and social inclusion research into libraries has been identified in a report prepared by the Library Association's Policy Advisory Group on social inclusion (draft copy); see also Morrison, M. and Roach, P., 1998, Public *Libraries and Ethnic Diversity: A Baseline for Good Practice*, The University of Warwick and The British Library Board; Gills, A, 2002, 'The right learning choices', *The Library Association Record*, 104(1), 45; and Muddiman et.al., 2000, *Open to All? The Public Library and Social Exclusion*, Vol. 1, Resource. A useful book which provides examples of good practice in public libraries drawing on a number of research studies is *Learning Development: An Introduction to the Social Impact of public Libraries* by Francois Matarasso published in 1998 by the British Library Board; see also Matarasso, F., 1998, *Beyond Book Issues: The Social Potential of Library Projects*, Comedia and the British Library Board.

(2001), by recent curriculum-related developments – with an emphasis on transferable skills – as well as political and cultural changes. In the past few years, a lot more pressure has been put on libraries to demonstrate their worth, become accessible and accountable organizations, and justify their services in relation to the achievement of learning outcomes. Similar conditions have also driven research in the USA towards documentation of learning impact[27].

As was the case in museums, libraries do not seem to employ a common definition of learning. It appears that the term 'learning impact' is commonly used to denote learning outcomes which are usually measured in terms of academic achievement.

Some learning impact studies carried out in libraries are discussed below. The review starts with the more generic library studies, continues with studies of public libraries, school libraries, and a virtual library, and concludes with a study of a range of different types of library.

4.2.1 The current situation in the UK

If libraries are to have an impact on users' learning, they must be more responsive to users' needs. The barriers that discourage access to and use of libraries by lifelong learners[28] (Hull 2000) were the subject of research conducted by the Library and Information Services of the University of Teesside for the Library and Information Commission. This research showed that barriers discouraging access to libraries among socially excluded groups relate to: gender, with women being more likely to have problems with retrieving information, locating items physically, and using electronic sources (they do, however, ask for support when they need it); age, with people over 21 being more likely to report problems with information retrieval than those under 21; ethnic background, with

[27] For example, see Kuhlthau, Carol Colier, 1993, 'Implementing a process approach to information skills: a study identifying indicators of success in library media programs', *School Library Media Quarterly*, Vol. 22(1); also Lane, K.C., Welborn, L. and Hamilton-Pennell, C., 1993, *The Impact of School Library Media Centers on Academic Achievement*, Hi Willow Research Publishing, CO, USA.
[28] The study was carried out in one new university and two colleges of further education.

minority groups being more likely to lack the confidence to use the library; and access to a PC at home, with PC owners[29] making greater use of information resources in general. The researcher (Hull 2000) concluded that 'there is a need for compensatory action' such as provision of adequate access to IT in libraries, forging partnerships between lecturers and professional librarians; and offering training sessions in information retrieval skills.

Similar research to investigate the value of public libraries to lifelong learners (Proctor 2002) was carried out by the Department of Information Studies at the University of Sheffield. The study focused on 'low achievers' who were defined as 'those adult learners leaving school without recognised qualifications'. The main findings can be summarised as follows:

- Public libraries are under-used by men in particular, and rarely used as a learning resource by disabled and elderly people

- Many users (60%) have no recognised qualifications

- 'Low achieving' adult learners are less aware of the learning potential of libraries than other users

- Public libraries can play a long-term role in generating an interest in learning interest through the material they provide

- 'Low achievers' are less aware than 'achievers' of how their learning could be facilitated by using the library

- There is a strong indication that encouraging library use by children can enhance educational achievement at school and, later, in the workplace. Findings suggest that only 20% of those who had been library users since childhood were 'low achievers'

[29] These mainly belong to the professional classes.

- The combination of library services offered via computer terminals and academically 'low achieving' public library users present public libraries with the challenge of helping 'its users to interpret their needs in term of services offered' (p10).

In a study carried out at three public libraries – in Lincoln, Grantham and Loughborough – the researchers examined the impact of adult non-fiction books on users in the East Midlands (Timperley and Spiller 1999). The reasons given by the most of the 400 respondents for borrowing non-fiction books related to learning: a need for information or practical instruction (29%); a hobby or a special interest (26.5%); a course of study (13.3%); personal learning and development (12.5%); job-related (5%). Men borrowed books mainly for hobbies and personal learning, while women borrowed mainly for study, information/practical instruction and jobs. Most respondents said that reading the books had made an impact on their lives, the degree of impact depending on the reason for borrowing them. The authors (Timperley and Spiller 1999:31) conclude that public libraries provide 'a support system for the complex process of decision-making necessary throughout people's personal lives'.

Turning to school libraries, we now examine a research study carried out in secondary schools in Scotland to explore the impact of the school library resource centre (SLRC) on learning (Williams and Wavell 2001). The study was divided in two phases, with the second phase building on the findings from the first. The first phase involved examination of teachers', pupils' and librarians' perceptions of how school library resource centres can facilitate learning and inform the development a framework of potential learning experiences. This framework was then used in the second phase as the basis for collecting empirical evidence of learning experiences and testing the validity of the indicators used.

The evidence and indicators of learning impact are shown in table 2, together with the methods of assessing impact and the factors that seem to influence effective learning, as presented in the report. The researchers

(Williams and Wavell 2001) highlighted the fact that there was evidence of accidental learning taking place (beyond the teachers' goals) and the need to assess learning impact on users across different learning contexts and over longer periods of time.

A more focused study of the value and impact of virtual outreach services (the VIVOS project) on healthcare professionals was carried out by a team of researchers (Yeoman et al 2001) at the University of Wales. The field research for the multi-faceted study was conducted at sites in Salford, Trafford, Cornwall, Leicester, Bury St Edmunds, South Humber, Exeter and North Thames. The reasons given by the professionals for their use of the virtual outreach services provided by librarians (Yeoman et al 2001:52) were: 1) educational requirements; 2) patient care; 3) research; 4) review of practice procedures; 5) preparation of guidelines and protocols; and 6) audit procedures.

The predominant use of the services for learning and professional development is of particular relevance to our own study. The researchers (Yeoman et. al. 2001:55) concluded that 'outreach services such as those surveyed here have an important contribution to make in equipping practitioners with the necessary skills to critically appraise and exploit the resources available, whilst simultaneously providing access to timely, relevant and topical information with a sound evidence base'.

The role that libraries play in supporting lifelong learning was the main focus of a study by a team of researchers at the Centre for Educational Development, Appraisal and Research (CEDAR) at the University of Warwick. The team investigated library learning at different stages in people's lives (Morrison et al 1998) through case studies of libraries in a primary school, further education college, company, hospital, and 'learning city'. The study showed that:

Evidence of	Indicators	Suggested evaluation methods	Factors influencing effective learning
Motivation	▪ Verbal and written expression of enthusiasm ▪ Willingness to participate in the activity set ▪ Application and absorption in the task ▪ Willingness to continue work either by returning to the SLRC or at home ▪ A change of attitude towards work over a period of time	▪ Observation ▪ Discussion and questioning about work during and at the end of activity ▪ Examination of work in progress ▪ Discussion with other members of staff about work, attitudes, etc ▪ Examination of reader records	▪ Interest, enthusiasm, and appreciation shown by others ▪ Appropriate intervention to ensure progress could proceed ▪ Familiarity with surroundings ▪ Foundation of necessary skills to proceed ▪ Understanding of task(s) ▪ Opportunity to try again and build on understanding ▪ New stimuli (ie, use of computer) ▪ Frustration caused by problems ▪ Tension within group ▪ Time constraints or inappropriate use ▪ Lack of focus, skills, background theory
Progression	▪ Awareness of, or ability to use, information involving finding and presenting skills ▪ The use of new knowledge in work or discussion of new knowledge ▪ Personal achievement or quality of work ▪ The ability to apply skills or knowledge in a new situation		
Independence	▪ The ability and confidence to continue and progress with a task unaided ▪ Awareness of the need for help and the confidence to seek it ▪ Awareness of the need for organisation and time management in work ▪ Use of initiative ▪ Increased self-esteem		
Interaction	▪ Discussion with others about task ▪ Peer co-operation ▪ Ability to mix with other groups ▪ Use of appropriate behaviour		

Table 2. Evidence and indicators of learning impact, methods of evaluating impact and factors that affect learning. Adapted from Williams and Wavell (2001: i-ii)

- The primary school library contributes to reading for enjoyment, programmes of study, the National Curriculum (by facilitating topic work), and 'the implementation of an information skills curriculum'

- The college library contributes to lifelong learning by providing information and support to its users (teaching staff, students and the community at large)

- The company library contributes to the professional and personal learning and development of its employees that continues after school, and the development of the company in the long-term. A company library can fulfil these roles by being an information resource, supporting individuals in their work as well as the company's goals, and providing the appropriate facilities and workspace for users

- The hospital library contributes by informing and educating patients about specific medical problems, and supporting healthcare professionals by providing them with information, carrying out literature searches, and training them in the use of IT

- The 'learning city' library partnerships perform a range of functions and provide access to learning resources which are not limited by time and place.

In the interviews carried out with regular library users as part of the Museums, Archives and Libraries User Study[30], the main reason they gave for going to a library was to find out something specifically related to hobbies or work-related interests. Libraries were perceived as quiet places for learning and information gathering by most of the people interviewed.

[30] In total, eight people were interviewed in Edmonton Green Library and Sidmouth Library by a member of the LIRP team.

Finally, research is being carried out at libraries in Essex to provide a user profile, determine the impact of children's library-based reading activities, and develop measurements of impact on lifelong learning (Tarrant 2002). We look forward to reading the results are when the reports are available.

4.2.2 Summary

There is a growing awareness of the contribution libraries make to the lives of different audiences at a time when learning, access and inclusion are high priorities. However, more user learning studies are needed to further our understanding of how people use libraries and how libraries affect their lives. There is some evidence that learning is narrowly defined in some types of libraries, perhaps because most of the studies we reviewed relate to school libraries. The term 'impact' is also used in studies more frequently used than the term ' learning outcomes', and often in reference to academic achievement.

We could only find a small number of 'learning impact studies' carried out with library users, some of which are based on very interesting approaches to describing and examining library learning. There is a need for more learning studies in this domain.

4.3 Archives

Until recently, archive services have been concerned primarily with the preservation of the archival records. But there has been a growing awareness within the archive profession of the need to make archives accessible[31] and demonstrate the impact they can make on users. Indeed, many archives services – especially those in the public service – now have a broader collecting remit and open up their holdings to wider audiences.

The primary purpose of archive services is to provide public access to information resources originally created to meet the needs of specific organisations. Their collecting activities are not limited to official archives of public bodies or organisations, and some provide a home for maps and plans, photographs, ephemera and stray documents (ie, manuscripts not in their original archival context). They may also make available surrogate copies (eg, on microform) of relevant material held elsewhere and provide access to secondary sources such as printed materials relating to their area. The combination of these resources is a rich quarry for exploitation.

However, the use of the resources in practice is subject to a number of constraints related to the scale of activity and the resource base of the archive repository network. The capacity for developing services other than preserving archives and providing public access to them has, until now, been fairly limited. For many years, archives have been aware of their potential contribution to learning, but constrained by resources from significantly increasing their levels of activity in this area. For example, even among the larger archives, only a few have education officers or make specific provision for formal learning. Those that do include the County Record Offices for Hampshire, Gloucestershire and West Sussex; and the Public Record Office has an education unit and offers a web-based resource – *The Learning Curve* – for teachers.

[31] See Pickford, C. and Watt, I., 2000, *Standard for Access to Archives – A Working Document*, British Standards Institute; Norgrove, K., 2001, *Taking Part: An Audit of Social Inclusion Work in Archives*, The National Council on Archives; and Archival Mapping Project Board, 1998, *Our Shared Past: An Archival Domesday for England* - Local Authority Archival Services in England: funding opportunities and development needs.

As a result, learning impact studies of archives are even scarcer than those of libraries. Of the studies that are available, most are user surveys, providing basic demographic data, and performance indicator studies. We found only one study reporting results somewhat relevant to the aims of this paper[32] (its should be noted that although the focus of the study includes learning, the definition of the term and the context for its use are unclear).

4.3.1 The current situation in the UK

There is some anecdotal evidence, but a scarcity of reliable documented information, about how people use archives and how archives contribute to their learning. The 2001 National Survey of Visitors to British Archives looked at issues related to users' motivation and the cultural role archives play in the community (Pick 2001). The findings show that a large number of archive users (83%) visit because of a personal interest or a hobby, while almost all the rest (16%) look for information related to a specific learning/research project. A high percentage of return visitors to archives use them regularly[33] and, as a result, are experienced users. A high percentage (87%) of users reported visiting the area with the specific purpose of going to the local archive.

Many users indicated that visiting an archive is both a learning experience (79%) and an enjoyable and satisfying one[34] (70%) when asked to choose from a list of statements that would best describe their visit. A majority of users (61%) also thought that they learnt more about history and culture in particular. In the part of the survey about the role archives play in society at large, the percentages of users who chose the following descriptions from a list of options were as follows: preservation of our

[32] At the final stages of editing this paper, we found another study carried out carried out at Lancaster Archives which we could not review due to time constraints.
[33] 31% have been using archives for more than 5 years (with 16.6% of those been using them for more than 10 years) while 33% for more than one year.
[34] Users could make multiple choices.

culture (82%); a means of strengthening family and community identity (72%); and providing opportunities for learning (66%). The survey also provided evidence of social learning taking place with the finding that users would share information gathered at an archive with other family members (74%), friends and/or colleagues (38%), and the wider community — use in a publication (15%) and use for lecture or talk (11%).

The part of the Museums, Archives and Libraries User Study conducted in archives[35] by the Learning Impact Research Project team supports many of the findings of the national survey described above. A large majority of the people interviewed said that archives have an educational value and they use them to find out specific things (usually to do with family history) from unique material. All the interviewees were regular archive users and had specific plans for use of the archive that related to a hobby. Finally, a comparative study between library and museum users visiting for identity-based reasons would pose an interesting opportunity.

4.3.2 Summary

Given the small number of learning outcome studies carried out in archives, we can only suggest that more systematic work is needed. It seems that although some archive professionals are becoming aware of the range of learning potential archival material can offer their users, learning is narrowly defined and not perceived to be among their core functions.

[35] Interviews we carried out in Liddell Hart Military Archives at King's College London, Guildhall Library London, London Metropolitan Archives and Oxfordshire Record Office. Eight interviews were completed in total.

5.0 Conclusions

This paper brings together a wealth of material on learning and learning outcomes, and relates learning outcomes — a term dating back to the 1950s — to the theoretical approach on which it is based. It also provides a history of the use of the terms learning and learning outcomes in formal education and open learning environments. More specifically, it examines the way these terms have been applied to museum, archive and library research studies.

Several points have emerged from the discussion. The concept of learning outcomes has been closely linked to behavioural and didactic approaches to learning used in formal education systems in North America and Western Europe for the past three decades or longer – and in many cases, still in use. Designed as it was, as a set of indicators or criteria to be used by teachers for measuring changes in students' behaviour, it is no surprise that the concept is most appropriate for use in systems of formal education.

Behavioural and didactic approaches have been influential in museums, archives and libraries both in the development of educational services and the way these services are evaluated. They have been used in many research and evaluation studies to try to measure learning against the objectives of the services provided. However, it is much more difficult to apply the concept of learning outcomes to open learning environments which are flexible, adaptable, accessible to a wide range of people from different backgrounds and with different learning needs. In the case of museums, archives and libraries, users may fall into one or more categories of user — formal, informal or self-directed — according to their motivation for learning (or for visiting in general).

Learning outcomes from the use of museum, archive and library are also difficult to measure because outcomes are subject-, site-, activity- and material-specific, and museums, archives and libraries are very diverse organisations providing different services and drawing on different types

of resources to deliver them. The extent of diversity within and across the three domains results in a greater range of available learning outcomes than in formal learning environments.

However hard it may be to assess learning outcomes in the three domains, we believe it is possible to examine the different ways in which they affect the lives of their users – both actual and virtual users. To do this, a lot more work is needed to build upon the research that has already been carried out, especially in museums and libraries. The task requires a systematic approach by partnerships between organisations across the sector.

To do effective research, museums, archives and libraries will need a clear definition of learning, and a broad set of learning outcomes flexible and open enough to encompass a wide range of possible learning outcomes for users, whether learning as individuals or in groups. Definitions of learning and its outcomes are of great importance in determining the research choices that will need to be made. Last but not least, museums, archives and libraries will need to devise a common research agenda, based on a common theoretical framework, to allow the results of different studies to be compared and so create a body of knowledge that can describe learning and its outcomes within and across the three domains in the UK.

6.0 Recommendations

Based on our conclusions, we recommend that museum, archive and library professionals:

- Develop a shared definition of learning and awareness of the different approaches to learning

- Conduct systematic research in their own organisations, and in collaboration with others, within and across the three domains using theoretical approaches sensitive to the nature of the domain (such as constructivism or socio-cultural theory). This requires the drafting of a research agenda – based on an agreed theoretical framework — that can be shared by all organisations across the sector and used to examine learning that takes place at both actual and virtual sites

- Carry out more theory-based evaluation. Research and evaluation work should be carried out by museums, archive and library staff after training in specific research and evaluation methodologies. This requires the creation of opportunities for professional development and the provision of relevant courses in graduate and postgraduate university programmes of museum, archive and library studies

- Start with a list of flexible and openly-defined learning outcomes and add to it as more research is carried out and new and different learning outcomes are identified

- Take account of the context and the culture of the organisation when planning research projects

- Take account of the nature of the activities to be evaluated as well as the material used for them.

7.0 Methods of assessing learning and learning outcomes

This section summarises some of the main evaluation methods[36] that have been used in studies carried out in different kinds of organisations — including museums, archives and libraries – and based on various methodological approaches.

Basic methods of data collection include questionnaire surveys, in-depth interviews, structured interviews and behavioural mapping or observation. Information on the strengths, weaknesses and likely costs of each method are shown in Tables 3-6.

Other methods of collecting data and are outlined below (the use of multiple methods of data collection is advisable for evaluation studies).

Concept mapping[37]: A method of showing how participants link things, ideas, or people.

Interviews about instances and events[38]: A conversation between an interviewer and interviewee about situations, often using line diagrams (representing a concept, a natural phenomenon or social occurrence) or actual objects and events, to investigate the interviewee's construction of meaning.

Visual imagery[39]: A method (always related to other types of evidence) that can help, among other things, to reduce over-dependence on verbal

[36] For more information on evaluation methods used in museums in particular see Hooper-Greenhill, E. and Moussouri, T., 2002, *Researching Learning in Museums and Galleries 1990-1999: A Bibliographic Review*, Research Centre for Museums and Galleries, University of Leicester; also Moussouri, T, 2000, *Research Digest*, Centers for Curiosity and Imagination, available on-line at: http://www.centresforcuriosity.org.uk/digest/htm.

[37] For more examples on the use of the technique see White, R. and Gunstone, R., 1992, *Probing Understanding*, The Falmer Press, UK, 15-43; and Falk et. al., 1998, 'The effect of visitor s' agendas on museum learning', *Curator*, Vol. 41, No. 2, 106-120.

[38] For more information see White, R. and Gunstone, R., 1992, *Probing Understanding*, The Falmer Press, UK, 65-81.

[39] More information in White, R. and Gunstone, R., 1992, *Probing Understanding*, The Falmer Press, UK, 98-106; and also Moussouri, 1997b, 'Using children's drawings as an evaluation tool in the museum', *Museological Review*, Vol. 4, Leicester University Press, 40-50.

methods and reveal types of understanding that may be hidden when using other methods.

Focus groups[40]: Can help provide answers to 'why' questions and insights into the dynamics of group response.

User diaries: This method requires the establishment of a close and regular relationship with users. It can, for example, be used to evaluate learners' progress at critical points in long-running programmes.

Critical incident technique[41]: A method aimed at gaining an insight into an incident from the perspective of the respondent, taking into account cognitive, affective and behavioural elements.

Vignettes: A method of providing respondents with a hypothetical scenario – a problem not too familiar to them – to see what techniques they use to solve it.

[40] For more information see Krueger, R.A. and Casey, M.A., 2000, *Focus Groups: A Practical Guide for Applied Research*, 3rd edition, Sage, USA.

[41] Both the critical incident and the vignettes techniques have been used in a library study: Yeoman, A. et. al, 2001, *The Value an Impact of Virtual Outreach Services: Report of the VIVOS Project*, Library and Information Commission Report, Department of Information and Library Studies, University of Wales – Aberystwyth, UK.

QUESTIONNAIRE SURVEYS

Strengths	Weaknesses	Likely costs
• A lot of existing experience among people who have carried out questionnaire surveys in other nearby museums, visitor attractions, etc. You may be able to use, with minor modification, questionnaires they have designed – provided they answer the questions you want answered. Be careful! • Quite cost-effective. You can produce a large number of questionnaires for the price of the print run. However, the more you produce, the more you will have to analyse. Also a larger sample may mean a more accurate sample. • Again, easy to train people to give out questionnaires, or administer them.	• While there may be expertise available locally in the design and production of questionnaires, it doesn't mean that it's going to be good expertise! There are many badly designed questionnaires around. Poorly designed questionnaires give you inaccurate, unreliable and therefore useless results. Questionnaire design is a skill. • Large sample needed for reliable and representative results. • May require the use of computer to analyse results: see comments on structured interviews.	• Considerable staff time to plan, supervise, analyse. • Specialist advice as necessary. • Printing questionnaires – depending on length and print run. • Off-the-shelf questionnaires. • Interviewers' fees – ranging from student rates, staff time or professional interviewers. 20-40 questionnaires per interviewer per day depending on length. • Computer processing costs.

Table 3: Collecting data using questionnaire surveys. From Binks and Uzzell (1996: 224).

IN-DEPTH INTERVIEWS (with a small sample of people)

Strengths	Weaknesses	Likely costs
• Detailed qualitative information, very revealing and 'true'. • Enables exploration of issues both guided and in response to respondents' concerns and agenda. • Useful for initial exploration of issues prior to a more representative survey. • Does not require sophisticated technology to analyse data, although there are advance computer programs which will, after content analysis, analyse the findings.	• Time-consuming. • Typically only feasible with a small sample, therefore difficult to make representative. This may not matter – depends on purpose. • Needs skilled interviewer. • Difficulty of interpreting information – content analysis is typically used.	• Staff time to plan supervise and, analyse. • Specialist advice (training of interviewers as necessary). • Skilled interviewers' fees vary– maybe four interviewers per day per interviewer. • Interviewers' travel costs if interviews are home based. • Cost of computer processing if appropriate.

Table 4: Collecting data using in depth interviews. From Binks and Uzzell (1996: 224).

STRUCTURED INTERVIEWS

Strengths	Weaknesses	Likely costs
• Can deal with a larger sample than in-depth interviews. • Allows respondents to elaborate their answers, perhaps unlike a questionnaire. • Not too difficult to train interviewers. • Can also be useful for initial exploration of issues prior to a more representative sample survey. • Can use data in a qualitative or quantitative way.	• Labour intensive and therefore expensive. • Large sample needed (like a questionnaire survey) if it is to be regarded as representative of a larger population. • May require the use of computer to analyse results, with consequent need to understand statistics and computer programs. There are now many 'off the shelf' computer programs available, but they still require an understanding of the statistical analyses, and the assumptions on which the statistics are based.	• Staff time to plan, supervise and analyse. • Specialist advice as necessary. • Printing costs of interview schedule/questionnaire. • Interviewers' fees may vary ranging from student rates to professional market research interviews. 15-20 interviews per interviewer-day. • Computer processing.

Table 5: Collecting data using structured interviews. From Binks and Uzzell (1996: 225).

BEHAVIOURAL MAPPING OR OBSERVATION

Strengths	Weaknesses	Likely costs
• Direct measure of the public's behaviour. What the public say they do and what they really do are often two different things. Enables you to see how they actually use your exhibition, country park, etc. • Useful complement to other techniques such as questionnaires or interviews, as it enables you to check or corroborate responses. • Low technology – pencil and paper. • Inexpensive.	• Time consuming. Following or observing one person around an exhibition may take 30 minutes, therefore limited number can be completed in a day. • Doesn't provide you with the visitors' accounts of what they were doing or why. You have to interpret their actions: in some cases it is not clear what people are doing. They may spend five minutes looking at an exhibit – this could be because it is fascinating, or because they are having great difficulty understanding it.	• Staff time to plan, supervise and analyse. • Specialist help if necessary. • Observers' fees: student rates or equivalent staff time. • Computer analysis as appropriate.

Table 6: Collecting data using behavioural mapping or observations. From Binks and Uzzell (1996: 225).

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Selected website resources

The following websites present useful information related to theories of learning as well as definitions of the term 'learning'.

http://teachnet.edb.utexas.edu/~lynda_abbott/Behaviorism.html

http://stange.simplenet.com/psycsiteannex/EducationAndPsychology/lerni.htm

http://www.ilos.net/~demeter/learn-for-life/informal/definition.html

http://www.cren.net/~jboettch/present/meaningful/tsld008.htm

http://faculty.valencia.cc.fl.us/ffarquharson/LSDef.html

Websites on learning outcomes:

http://www.resource.gov.uk/action/learnacc/muslearn/outcomes.htm

http://www.ac.wwu.edu/~assess/slo.htm

http://www.bced.gov.bc.ca/irp/curric/lo.html

http://www.mdk12.org/mspp/mspap/whats-tested/learneroutcomes/

http://www.arl.org/newsltr/213/assess.html

http://measuringup2000.highereducation.org/assessA.htm

http://illinois.online.uillinois.edu/stovall/InstDsgnWorkshop/objectives.html

http://www.mala.bc.ca/www/discover/learnout/NEWSLTRS.HTM

http://www.worldbank.org/html/extdr/educ/edu_esat/monitor.htm

http://dbweb.liv.ac.uk/ltsnpsc/primers/writing_learnout.htm

http://www.studentassessments.com/bestpracticesoutline.htm

http://www.gse.harvard.edu/hfrp/pubs/onlinepubs/indicators.html

Appendix A

Learning outcomes as defined by educators working in formal education settings:

'A learning outcome is a statement of that which a learner is expected to be able to do or know at the end of his/her study.'
http://cwis.livjm.ac.uk/umf/vol2/ch2.htm

'Learning Outcomes: specific, *observable* measures which provide empirical evidence of student learning and which serve as part of an overall assessment or accountability process.'
http://pandora.cii.wwu.edu/guide/learning_outcomes.htm

'Learning outcomes are statements that specify what learners will know or be able to do as a result of a learning activity. Outcomes are usually expressed as knowledge, skills, or attitudes.

Learning outcomes should flow from a needs assessment. The needs assessment should determine the gap between an existing condition and a desired condition. Learning outcomes are statements which describe a desired condition – that is, the knowledge, skills, or attitudes needed to fulfil the need. They represent the solution to the identified need or issue. Learning outcomes provide direction in the planning of a learning activity. They help to:

- Focus on learner's behavior that is to be changed
- Serve as guidelines for content, instruction, and evaluation
- Identify specifically what should be learned
- Convey to learners exactly what is to be accomplished.'

http://www.aallnet.org/prodev/outcomes.asp

'Student learning outcomes are concise descriptions of the knowledge and skills that students are expected to learn in a course or grade in a subject

area. They are statements of what students are expected to know and be able to do in each subject at each grade.'
http://www.edu.gov.mb.ca/metks4/parent/report/student.html

'In brief, **aims** are broad purposes or goals; **objectives** are specific intentions in measurable terms; and **learning outcomes** are specific measurable achievements. The main difference between the last two is that objectives are stated as the intentions (of the tutor) and outcomes are stated as the achievements (of the successful student). While we have mainly used objectives in the past there has been a gradual move towards outcomes. In future, we must use learning outcomes.'
http://www.herts.ac.uk/tli/locfaqs_main.html

Appendix B

Methods of investigation

1. Literature review: This report was based primarily on the review of the relevant literature which includes:

- General books and articles on learning theory
- Books, articles and reports on learning and learning outcomes in formal education and in museums, archives and libraries
- Policy documents of professional organisations for museums, archives and libraries, as well as member organisations
- Government documents.

2. Interviews with museum, archive and library users: Thirty interviews were carried out with adult users (the questionnaire is included in Appendix C) in different organisations. Users were chosen according to the following criteria:

- Age group
- Type of visit (generic or specific)
- Socially diverse (ethnicity)
- frequency of visiting.

The organisations chosen fell into at least two of the following criteria:

- Location (north, south, rural, urban)
- Size (large, small, regional, local)
- Type (national, independent)
- Subject matter (general, specialist).

The organisations used for the interviews are: Horniman Museum and Gardens, London; Abbey House Museum, Leeds; Leeds City Art Gallery; Liddell Hart Military Archives, King's College London; Guildhall Library, London; London Metropolitan Archives; Oxfordshire Record Office; Buxton

Museum and Art Gallery; Edmonton Green Library, London, and Sidmouth Library, Devon.

3. Web search: An extensive web search was carried out using the following key words:

- Learning
- Learning outcomes
- Formal education and learning outcomes
- Further education and learning outcomes
- Adult education and learning outcomes
- Bloom
- Gagne
- Evaluation and evaluation methodology
- Research and research methodology
- Anger management
- Conflict resolution
- Healthcare research.

We also consulted websites of specific professional organisations:

Resource: The Council for Museums, Archives and Libraries
Library and Information Statistics Unit (LISU), Loughborough University
Library and Information Science Abstracts (LISA)
Library and Information Commission
The National Council on Archives
National Archives
Society of Archivists
The Institute for Museum and Library Services, Washington, DC
Association for Science-Technology Centers (ASTC), Washington, DC
Smithsonian Institution, Washington, DC
Program Evaluation and Research Group (PERG), Lesley College, MA
Museum Learning Collaborative, University of Pittsburgh
Institute for Learning Innovation, Annapolis, MD.

Specific resources that seemed relevant were selected, and information, references and copies of reports requested from individuals within these organisations.

4. Informal unstructured interviews with museum, archive and library researchers and practitioners: These were conducted face-to-face and via telephone and email (directly and through email discussions lists). The people consulted were:
George Hein (Lesley College, MA, USA)
Terry McClafferty (Western Australian Museum, Kalgoorlie, Australia)
Sherman Rosenfeld (Weiztman Institute, Israel)
Laura Martin (Arizona Science Center, USA)
Richard Toon (Arizona Science Center, USA)
Morna Hinton (Victoria & Albert Museum, London, UK)
Jean MacIntyre (Bishop Grosseteste College, Lincoln, UK)
Kate Pontin (University of Leicester, Leicester, UK)
Kirsten Ellenbogen (King's College London, UK)
Ben Gammon (Science Museum, London, UK)
Jonathan Osborne (King's College London, UK)

5. Email discussion lists:
The research team drafted – in consultation with Resource – an email message which was sent to a number of email discussion lists related to museums, archives and libraries (the message is included in appendix D). The lists were those for:
Group for Education in Museums (GEM)
Visitor Studies Group (VSG)
LIS-LINK
LIS-IIS
LIS-LIRG
LIS-PUB-LIBS
LIS-BAILER
ARCHIVES-NRA
Resource.

Appendix C

Questionnaire for users

Hello, my name is … and I'm from Leicester University. I'm doing a research project looking at how people use museums or libraries or archives (depending where you are). Would you mind if I ask you a few questions? It'll only take 4-5 minutes.

1a) Have you been here before? YES / NO

IF YES

1b) How many times would you say you have been in the last 12 months?

2) Did you plan to do/see something in particular here today?

3) Did you manage to do or see that?

4) Did you do/see anything else?

5) Does your visit relate to things like a course of study, hobbies or something connected to your work?

6a) Are there any other places you visit to find things you need to know (prompt if needed: like libraries, museums, archives, etc) YES / NO

IF YES

6b) (prompt) Which ones have you been to recently?

7a) What is the specific value to you of visiting museums or libraries or archive?

7b) What is the specific value to you of visiting this museum or library or archive?

8) Which age group do you belong to?

18-24 25-34 35-44 45-54 55+

9) MAN / WOMAN (indicate which)

10) When did you complete formal education? At what age did you leave school, college or whatever?

11) What is or was your occupation?

Name of interviewer

Name and location of organization

Time and date

Appendix D

The email message sent to the email discussion lists under the subject of 'defining and measuring learning impact'.

Dear List members,

The Research Centre for Museums and Galleries in the Department of Museum Studies at the University of Leicester has been commissioned by Resource: the Council for Museums, Archives and Libraries to research ways of defining and measuring the impact of learning in museums, libraries and archives. This study is one element of the Inspiring Learning Framework that Resource is developing. A copy of the Inspiring Learning Framework paper can be found on the Resource website (www.resource.gov.uk).

Resource is seeking information on the impact of museums, archives and libraries on learning and to use this to demonstrate the value of archives, museums and libraries to government.

We would like the research process to be open to comment, and intend to use a number of email lists to inform people working in museums, libraries and archives of our thoughts as they develop.

At the moment we are working on defining learning outcomes. We need to develop a generic way of doing this that can be used across all three domains (libraries, archives and museums). By 'learning outcomes' we are not thinking about processes, for example delivering programmes for specific groups of learners, but about the measurable impact on a child, teacher, adult, visitor, for example thinking in different ways, knowing more about something, changing their mind about something, etc).
We would be interested in hearing from you, in particular regarding how you define learning outcomes?

At the moment, we are gathering information on ways of thinking about what might count as a 'learning outcome'. Once we have come to a view of what the answer might be (hopefully incorporating the comments you will send us) we will post our draft definitions of learning outcomes to this list for comment. This will happen in the New Year.

Having developed an appropriate set of generic learning outcomes, we will be developing specific research tools for measuring these outcomes. This will include both qualitative and quantitative methods. We will be starting on this work after Christmas and will contact you again about your thoughts on this. Many thanks for your interest.

Eilean Hooper-Greenhill

Jocelyn Dodd

Theano Moussouri

John Vincent

Marlene Morrison

Chris Pickford

François Matarasso