Lifelong Learning Programme

AMORES

An Approach to Motivating learners to Read in European Schools

DELIVERABLE D1-1

State of the art in pedagogies employing e-artefacts

Version 1.0

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AMORES

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ABSTRACT:

This document aims to inform the development of a methodology for the project by identifying the key pedagogical theories on which the project draws, drawing on previous experience of creating learner-generated content and using social media, and draws on the previous practice of the participating schools. It also aims to evidence the underlying assumption of the AMORES project, that generating a love of literature is an important development goal for children.

The key pedagogical theories on which this project builds are that of constructionism, which contends that creating artefacts is itself a trigger for learning experiences, and also that creation is a social activity, and this social activity is also a basis for learning. The aims of the project are therefore to encourage both of these.

The second theory is that of experiential learning, particularly encouraging metacognition through reflection and abstract conceptualisation, as a result of the creation of objects. The third theory draws on the role of storytelling in motivating and empowering learners and builds on the experience of the Sheherazade project.

The creation of artefacts has been demonstrated to be an effective tool – and evidence shows that creating videos (the type of artefact identified by teachers as being the predominant one to focus on in the AMORES project) is particularly effective. Social media is more problematic, in that it normally facilitates superficial “likes” and “shares” and requires more sophisticated tools and support to create genuine co-creation and reflection within a community.

The practice at the schools indicates that they are experienced at creating videos, but less so at maintaining social creation at a distance. The social aspects of learning at a distance may therefore be the most difficult area to encourage within the project, as it is both more problematic to conduct, and is less practised within the schools.

KEYWORDS: constructionism, constructivism, social constructivism, social media, learner-generated content, experiential learning, storytelling

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1. Introduction

This document is the first deliverable of the AMORES project and is intended to inform the consequent work of the project with a background in previous work in the field. The function of the literature review within the project relates directly to deliverable D1-2, in that it identifies some of the key questions to answer in any user needs analysis, and relates directly to workpackage 2, in that it informs the approach taken within the methodology suggested to the teachers, and forms part of the background material for the online module. It is also intended to act as a resource for dissemination activities by providing a bank of materials that can act as introductory texts for reports and articles written about the AMORES project. Although the literature review summarises the knowledge at the start of the project and is delivered as an output of workpackage 1, the intention is that it will be expanded upon as more literature is reviewed and more complementary projects are engaged in as part of project activities.

The literature review contains the following sections:

- The identification of relevant pedagogical theories to inform the work of the project
- Review of previous work that researches the use of learner-generated content as a method to encourage learning and teaching. This was expanded to include additional research on the use of video as a consequence of the outputs of the workshop conducted with teachers (D2-1) in which video was focused on as the most useful and practicable of the potential technologies to employ.
- Review of previous work on the use of social media as a communication tool in teaching and learning. Learner-generated content is not only a valuable learning activity in itself, but it also contributes to the learning experience by providing a focus for social activity. Since the AMORES project aims to foster online collaborative international activity between schools, the role of social media in this was considered to be essential.
- A look at the value of literature education in the personal and academic

development of learners. From the initial project writing stages, the importance of generating a love of literature in young people was held to be self-evident. Identifying research that objectively supports this implicit assumption is important for validating the importance of the work of the project.

- A summary of the practice from the partner schools identifying where the experience is at its strongest and where they may be areas that require more emphasis in the online course for developing practice.

Individual technologies were not reviewed as these were considered to be of secondary importance to the pedagogical aspects of the project. Furthermore, the specific technologies that could be listed would become immediately out of date. Instead, specific technologies are mentioned in relation to actual uses to which they are put in different case studies. A fuller description of the technologies used in the project is covered in D2-2 “Technologies selection report”.

2. Theoretical perspectives

The use of technology within the AMORES project builds on three principles of education. One of these is that by encouraging students to create digital artefacts (or e-artefacts), the learning of the students will be advanced. This is a principle known as learning through design (Kafai and Resnick, 2011; 4). The other way in which technology is used to support learning is through encouraging students to communicate with each other using social media, and so jointly develop knowledge. This is a technique referred to as collaborative learning. The third is that the act of storytelling is itself a useful learning tool to encourage self-empowerment and communication and is an activity that students find engaging.

Learning through design is often described as an exemplar of constructivist theory in that "activities involving designing, making or programming – in short designing – provide a rich context for learning" through the process in which learners construct meaning through the act of design (Kafai and Resnick, 2011; 4). Driscoll (2005, 387) explores the terminology of "constructivism" and constructivist theories, and uses the term more generally, in her formulation what is being constructed is not an artefact but any formulation of knowledge. This definition overlaps with many other concepts, such as "generative learning", "embodied cognition" (the idea that how we think is based on how we interact with the world through our senses and proprioception [Wilson 2002, 626]), cognitive flexibility theory and postmodern and post-structural curricula. Driscoll notes that the predominance of the term "constructivism" to cover these terms stems from Piaget's use of the word in his seminal work. This wider definition is useful in informing the work of the AMORES project, in that we are also aiming to support students in constructing their own knowledge as well as artefacts and Driscoll's discussion reveals many problematic areas with this approach. An example of a potential pitfall created by placing the knowledge construction within the power of the student is that it can produce a highly subjective interpretivist view of knowledge (Driscoll, 2005; 388), which, irrespective of the importance of post-modernist curricula, can sometimes actually simply be *wrong* - Driscoll gives the

example of subjective experience leading children to believe that the Sun goes round the Earth. Within the project therefore, it is important for students to be at the centre of the construction of artefacts and knowledge, but within a carefully scaffolded environment of teacher support.

We will tend to use constructionism in its more specific sense of learning through creation and design of artefacts, though acknowledging the more general interpretation and its usefulness. For example, by linking constructionism to embodied cognition, Driscoll makes clear the relevance to education of linking children's learning to their physicality of making, holding, movement and acting.

Collaborative learning is described by social constructivism as a means by which meaning is constructed jointly by a community (Conole et al, 2005; 11) and requiring social negotiation (Driscoll, 2005; 397) and has been defined as "a situation in which particular forms of interaction among people are expected to occur, which would trigger learning mechanisms" (Dillenbourg, 1999; 5). Walton and Hepworth (2011) identified positive changes in cognition associated with experiencing online collaborative learning and put forward a model for a blended teaching and learning intervention (a mix of online and face-to-face approaches) that engages the learner and leads to higher order thinking. In a further paper (Hepworth & Walton, 2013) they went on to show that students who were exposed to online collaborative learning demonstrated a greater degree of learning in their assessed work. In a parallel study Cleland and Walton (2012) confirmed that online collaborative learning has a statistically significant positive effect on learning.

Further, as Driscoll also states,: "Another important function of collaboration in learning environments is to provide a means for individuals to understand (a) point of view other than their own". Negotiating meaning also offsets the highly subjective nature of knowledge created by a single person, by demanding that an inter-subjective knowledge-base be created. The strength of the AMORES project is that, by locating it within a European setting, the viewpoints that are being understood are not only their immediate classmates, but children from four other European countries and cultures, expanding the process of negotiation of meaning,

and challenging further their preconceptions about their constructed knowledge. Lewis, Pea and Rosen (2010; 7) summarise social constructivism as the process in which "By together questioning texts and situations, conceptualizing problems, designing solutions, building artifacts, redesigning, re-conceptualizing and reinterpreting, people generate forms of public knowledge that in turn provide conceptual and relational support for further interaction and learning".

Constructivism and social constructivism come together in the concept of constructionism, a term coined by Seymour Papert who both "contended that students engage in deep learning when they research, design and construct an artefact or model as a representation of their knowledge" and also that "constructionism links personal and social influences on learning because the artefact produced is an output of the interaction of personal and social knowledge construction that needs to be meaningful and made public" (Hoban, Nielsen and Carceller , 2010; 434). In short, meaning is created by the learner, both with interaction with an artefact and with other learners.

Constructionism draws on two perspectives on learning; predominantly this is the cognitivist perspective, but also it draws on a situative perspective too. The cognitivist perspective "views learning as transformations in internal cognitive structures. Pedagogically, it is characterised by processing and transmitting information through communication, explanation, recombination, contrast, inference and problem solving" (Conole et al, 2005, 11). The situative perspective takes the view that learning is a social participative activity, and is embedded in a community and a pre-existing dynamic of personal relationships and shared inter-subjective knowledge (Conole et al, 2005; 11).

Furthermore, learning through constructionism (or indeed any experiential learning activity) can be structured to enable learners to maximise the effectiveness of learning activities by sequencing them so that the act of creating an artefact is followed by feedback and then learning from this feedback in a reiterative cycle. One such learning cycle is the Kolb learning cycle (fig. 1) (Kolb and Kolb, 2009; 299) in which "immediate or *concrete experiences* are the basis

for observations and *reflections*. These reflections are assimilated and distilled into *abstract concepts* from which new implications for action can be drawn. These implications can be *actively tested* and serve as guides in creating new experiences" (Kolb and Kolb, 2005, 298 – 299).

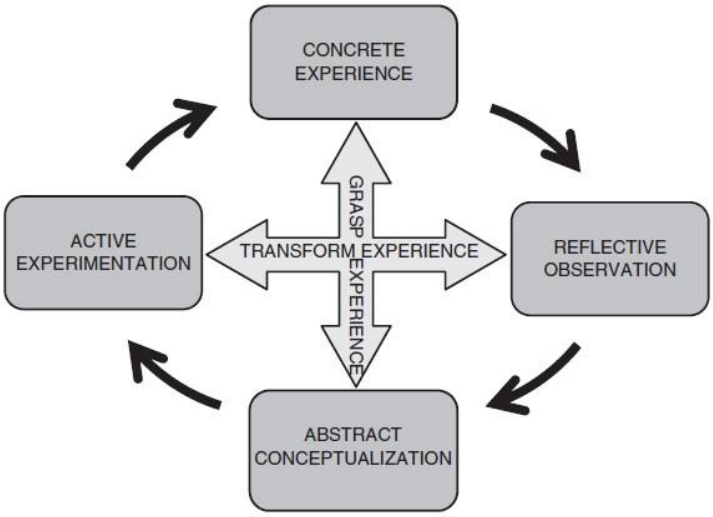

Figure 1. The Kolb Learning Cycle

The Kolb cycle is closely based on the Lewinian experiential learning model, which drew directly on the engineering concept of feedback (Kolb, 1984, 21) (fig. 2).

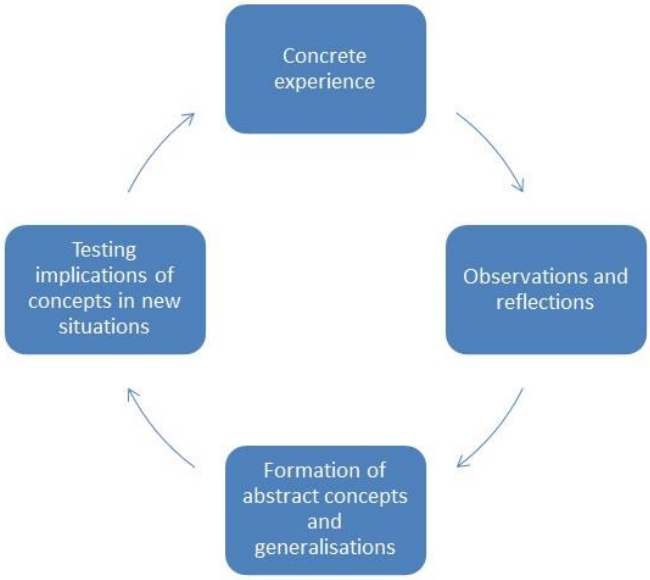

Figure 2. The Lewinian experiential learning cycle

These cycles are not only iterative, they are reflective (aware of the impact of the intervention) and reflexive (taking into account the results of the intervention and modifying the next cycle accordingly [Kolb and Kolb, 2009, 298]). Each iteration is intended to build in complexity, increasing the range and depth of the learners' understanding. Indeed, Kolb and Kolb argue that by making the learner aware of the nature of these activities and the types of learning that are occurring at each stage, that meta-cognition (i.e. learning about learning) can occur (Kolb and Kolb, 2009, 303).

The relevance for the AMORES project is evidently that the concrete experiences we are providing for the learner is the ability to create and construct digital artefacts *and to construct these within an expanded European-wide social environment so that meaning is negotiated*. However, the lesson from the Lewinian cycle is that, on its own, these experiences are not sufficient for effective learning to take place, but must be placed within a set of activities that enable learners to reflect, to build their own knowledge from the experience, and develop the skills to continue this process beyond the scope of the project. The advantage of the project placing these activities within a social network is that the scaffolding can continue throughout the cycle; not just the artefact design, but

also the children's reflection, their formulation of meaning, and their testing of implications can all be shared and negotiated with their peers.

The activities that the children will undertake through this cycle can also be structured in terms of the various degrees of complexity that are being set at each stage. A commonly used model for structuring complexity is Bloom's taxonomy. The original taxonomy was published in 1956 and consisted of six levels of learning, which were presumed to be hierarchical, i.e. each lower layer was needed to be achieved before the next layer was undertaken (Krathwohl, 2002, 213 – 213). These levels were: Knowledge (at the "lower order thinking skills" end), Comprehension, Application, Analysis, Synthesis, and Evaluation (at the "higher order thinking skills" end). Bloom's taxonomy was extensively revised in 2002 to become a 2-dimensional progression consisting of (along one axis) a similar set of characteristics; that is

> *"Remembering (at the lower level): Recognising, listing, describing, identifying, retrieving, naming, locating, finding*
>
> *Understanding; Interpreting, Summarising, inferring, paraphrasing, classifying, comparing, explaining, exemplifying*
>
> *Applying; Implementing, carrying out, using, executing*
>
> *Analysing; Comparing, organising, deconstructing, Attributing, outlining, finding, structuring, integrating*
>
> *Evaluating; Checking, hypothesising, critiquing, Experimenting, judging, testing, Detecting, Monitoring*
>
> *Creating (at the highest level): including designing, constructing, planning, producing, inventing, devising, making"*

(Churches, 2008; 2 after Krathwohl, 2002; 215). Across the other axis, these levels are split into Factual Knowledge, Conceptual Knowledge, Procedural Knowledge and Metacognitive Knowledge.

The practicality of Bloom's taxonomy was, however, largely been the inclusion of a set of verbs with to exemplify each level. Starting a sentence with one of Bloom's verbs is a simple but effective means to set a learning task at a certain order of thinking. As part of the modernisation of the taxonomy, the revised taxonomy has also been embellished with a set of verbs to exemplify each

of its levels, though these are not broken down into the separate knowledge types. An example of the range of verbs with which to describe learning activities at each level is shown in figure 3 (Churches, 2008, 3). The relevance of the revised taxonomy for the AMORES project is that it places creation – the central theme of the project – as the highest order learning activity.

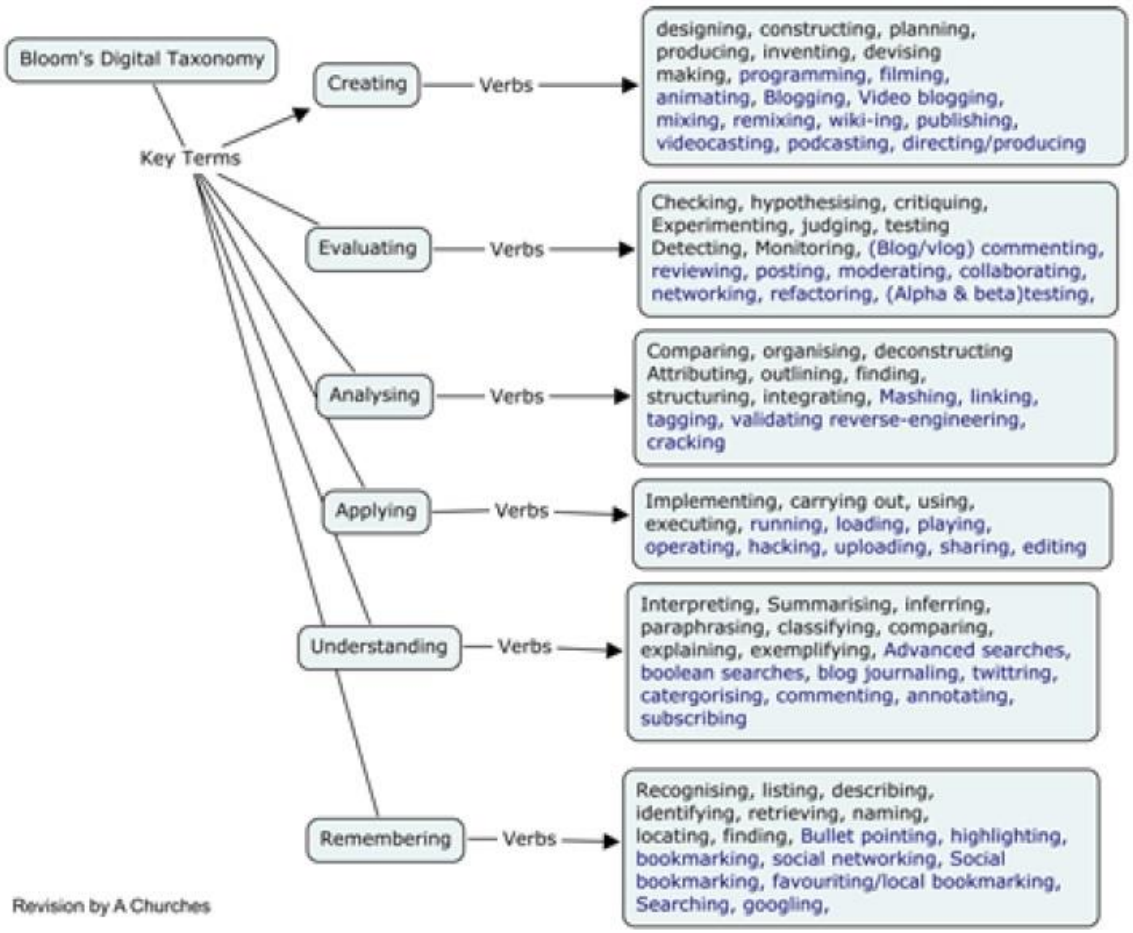

Figure 3. The 21st century version of Bloom's taxonomy.

In designing learning activities therefore, two aspects need to be taken into account: at what point in the Lewin experiential learning cycle the activity sits, and at what level in the revised Bloom's taxonomy does the activity take place. If both were to be followed dogmatically then early cycles would focus on remembering, but then build through understanding etc and so on up to creation, but the reality is that learning exists on several levels at once.

What both models omit, however, is to take into account the role that collaboration provides in accentuating and deepening the learning process – thus we might see a third progression, that of individual to cooperative to collaborative working. This aspect has been looked at extensively by Etienne Wenger, who explores the role of communities in learning through his communities of practice model.

Wenger's theories of social learning are linked to a range of other functions (Wenger, 1998; 12) see fig 4. Of most relevance to the AMORES project is that this social learning is intrinsically linked to artefact. For Wenger, artefacts mediate this social form of learning through a process of reification, which he defines as 'the process of giving form to our experience by producing objects that congeal this experience into "thingness"'. Once an idea is given form in this way it "then becomes a focus for the negotiation of meaning". Wenger also notes that reification is interlinked with participation (1998; 62-63); participation helps reify the concepts further, reification facilitates the participation in the practice.

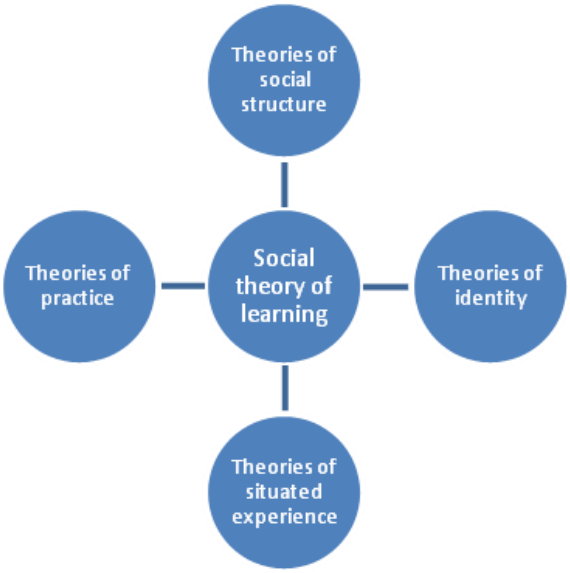

Figure 4. The other theoretical constructs to which Wenger's social theories of learning are linked (Childs, 2014; 78).

Thus when we examine the learning taking place through the creation of an artefact we would expect to see the design as a trigger for a set of learning

opportunities as the learner interacts with the object. We would also expect to see learning events happen as the learners interact with each other in its creation. This knowledge will both be a development of their understanding of the subject discipline but also embedded and influenced by the existing culture and dynamics of the connections between the learners. Additionally, in the social media activities undertaken by the learners, these will be situated in their experience and their culture (both online and offline), but also will build on their pre-existing knowledge, to form a new, more developed understanding of the subject discipline.

This development of social learning is further complicated by the need for the learner to progress through stages that gradually embed them, not only in the social processes of the culture or group, but also in the social processes of the technology. It is important that all participants are familiar enough with the technology that when it is time for them to socialise as part of the group they can dedicate their attention to that, rather than to manipulating the technology. However, it is also important that they have in place their social adhesion before they begin any of the learning activities that are reliant on that adhesion. It is to manage these various stages of interaction and place them in an appropriate order that Gilly Salmon (2001, 11) developed the 5-stage process, and linked these stages to appropriate learning activities. These stages are:

- Access and motivation.
- Online socialisation.
- Information exchange.
- Knowledge construction.
- Development.

And are shown in figure 5. By creating a ladder through these separate stages, each of which require different skill sets, Salmon indicates that each step can be more securely conducted, and the learning more effectively consolidated providing each is properly moderated and sufficiently completed before moving onto the next.

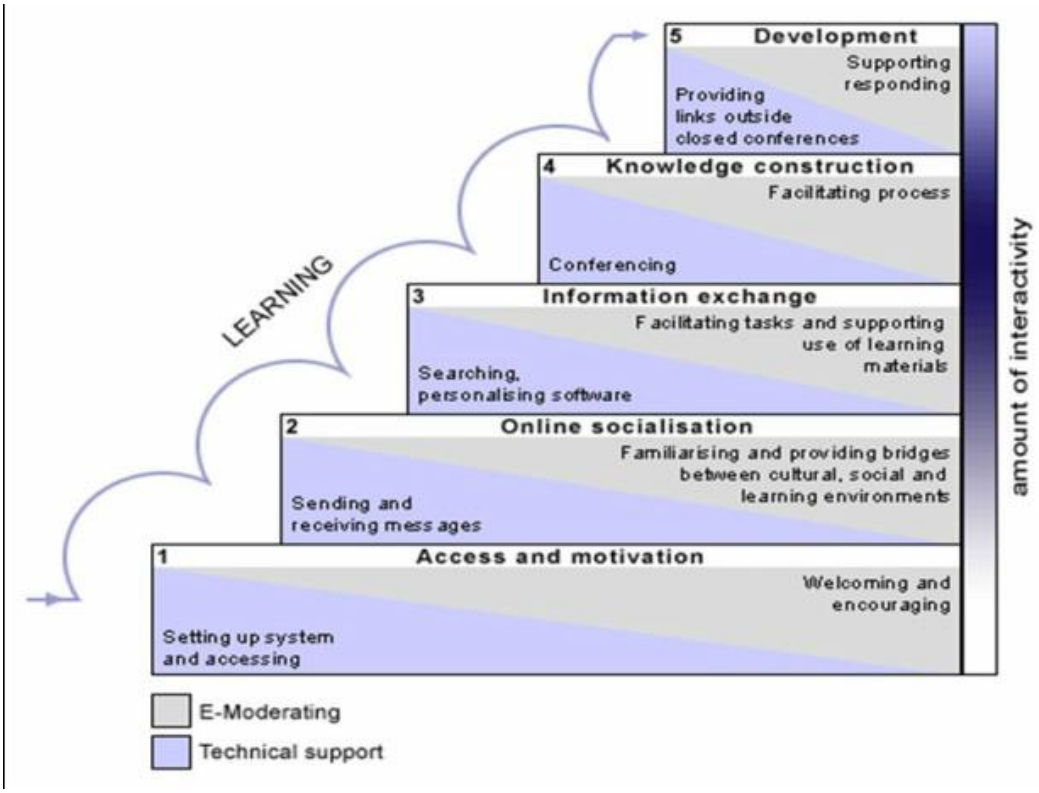

Figure 5. The 5-step process for effective online learning (Salmon 2002, 11). Image accessed from http://www.gillysalmon.com/five-stage-model.html

A third strand that, as educators, the participants of the AMORES project will draw upon is that of storytelling, a theoretical model for which is suggested by the Sheherazade project - a Grundtvig project funded under the EU's Lifelong Learning Programme (Sheherazade Consortium, 2011; 1). In this study, the authors drawn on Norwegian storyteller Heidi Dahlsveen's model of the principles of storytelling. This model is re-drawn here (figure 6) to accentuate its similarity to the experiential learning cycle of figure 2 and to reconfigure it for the environment that we are trying to create within the AMORES project, and which social media have made children familiar, that of sharing, mixing, re-purposing and re-mixing of content, so that one person's act of storytelling become the trigger for another story.

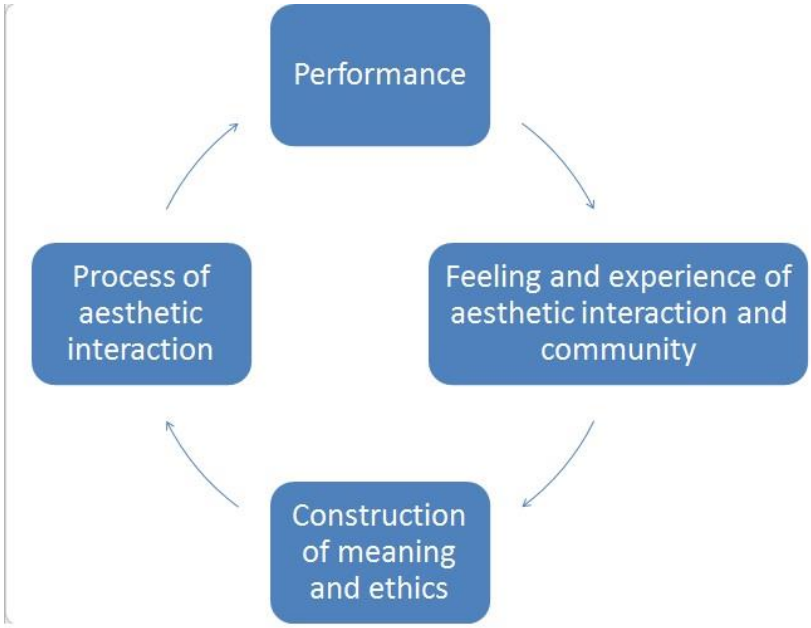

Figure 6. Heidi Dahlsveen's storytelling model, re-drawn to indicate resemblance to the experiential learning cycle

In this model, "construction of meaning and ethics" draws upon elements such as narrative structure, personal relevance, historical background, cultural background, intertextuality, contemporary aspects, interpretation, mythical moments and purpose. These factors can be the basis on which the creator of the original piece develops his or her story, but it can also be the factors by which the audience for that piece interpret and make their own meaning, and in a mashing, re-mixing, co-creating environment, go on to make their own artefacts. Within Dahlsveen's model the "process of aesthetic interaction" is the stage at which composing, experimenting, experience, improvisation, rehearsal, training, dramaturgy and telling take place.

The Sheherazade project links the use of storytelling to adult learning, finding it effective for promoting a series of useful learning outcomes. We would claim that it is reasonable to apply this equally, therefore, to children's learning as there is little credence given amongst educators to the idea that adult learning is substantially different from children's. For example, for each of the distinctions the Sheherazade Consortium draws about adult learning that:

- It is problem centred,

- It allows them to cope with life changes or difficult events.
- A safe and comfortable environment is important
- Adults' egos are on the line when they are asked to risk trying a new behaviour in front of peers (2011; 4),

Wheeler (2011) concludes that these equally apply to children.

The useful outcomes from storytelling identified by the Sheherazade Consortium report are that telling stories:

a) Helps learners conceptualise the learning process

b) Empowers the learner

c) Facilitates communication

d) Inspires personal growth

e) Engages the learner.

By encouraging the children in the schools to share their culture's stories, the intention is not only that they learn the subject matter better through constructionist learning (designing and socialising). They will also become more reflective learners through the development of metacognitive skills by embedding this constructionist learning in an experiential learning cycle. Furthermore they will become empowered through the key part of the artefact creation being the act of storytelling.

3. Creation of digital artefacts for learning

There are a wide range of technologies available with which students can create artefacts, from simple blog entries to 3D models in virtual worlds. For a state of the art piece aimed specifically at the needs of the AMORES project, the technology focused upon here is that of video. Not only was this the predominant technology revealed to already be in use at the relevant schools (see Table 1), this was also the technology that teachers selected at the workshop (D2-1). The

technology selection report (D2-2) makes clear why selecting a technology familiar to practitioners is an optimal strategy for projects that have a goal of innovative pedagogical practice. As a result of these decisions, the state of the art report was further modified to enhance its usefulness as a document to inform the teacher methodology.

Claire Allam described work carried out with undergraduates at the University of Sheffield in which she found that using the creation of video as a learning tool enabled students to engage creatively with the subject increased their motivation and enhanced their understanding (2007; 131). The reasons for this are numerous, the ones which Allam identified are:

- The novelty value; video-making is a very different form of activity than most students are familiar with in class.
- Personal engagement; as one student said “it does give you more of a personal connection with the text if you can take it away and make it yours” (Allam, 2007; 132).
- The creative act builds upon many other types of learning; as can be seen in the revised Bloom’s taxonomy above, creating contains the highest order thinking skills. To achieve this level of thinking depends upon all of the thinking skills that are of a lower order, thus in order to create, the creator must first synthesise and analyse.
- The creative act also requires students to use skills in collaborative working, organisation, communication and negotiation.
- Creating also requires bringing together divergent thinking skills (openness, subjectivity, intuition, emotion and imagination) and convergent thinking skills (logic, reasoning, analysis, objectivity and judgment) with respect to the subject domain they are making the video about. These are linked via the practical skills that need to be learnt and exercised in order to make the video. (Allam, 2007; 133)

Allam also encouraged the students to reflect on the process through a learning

journal and portfolio and these were used as the main assessed part of the module. Students were also able to feed back on each others' work through a final film show of all of the videos (Allam, 2007; 134).

The barrier with using video in education is predominantly the resource implication, both in terms of the students' time (Allam 2007; 133) and from the teacher and department (Allam, 2007; 135). Students needed to know some of the basics of film-making (such as the correct shots to take to tell a story, and to consider the final structure before they began shooting) and needed recourse to the teacher in order to check their progress. For the teacher, balancing the degree of involvement was problematic, too little and the students would struggle, too much and they would lose ownership over the process (Allam 2007; 132).

Encouraging the students within the AMORES project to consider the narrative form, and how to make the artefacts "readable" to viewers therefore needs to be explained and the process by which this is formulated needs to be supported. Furthermore, encouraging students to storyboard their videos before beginning production has the advantage of

1) motivating the students to engage with another technology (examples could be comic strip generators, or simply drawing programs) to create the storyboard,

2) create an additional set of artefacts to encourage more co-development and co-creation of content

3) pursue a lower risk strategy for students in that any weaknesses in construction or inappropriate content can be identified before larger expenditure of effort by the learners.

This experience of deeper learning was also found by Dale and Povey (2009) in which students were asked to create podcasts. Not only did the process of re-presenting information require them to understand the subject matter of the podcasts in greater depth, engaging both with theoretical perspectives and read further around the subject, the creative and imaginative aspects of the task gave

them the motivation to undertake these tasks.

The READIT project (a project within the Lifelong Learning Programme Comenius) aimed to encourage students' learning by engaging them with digital storytelling – defined as "the practice of combining narrative with digital content, including images, sound, and video, to create a short movie, typically with a strong emotional component." (Sheneman, 2010). In their report of the project McDonald, Miller, Cochrane and Linnane (2011) state that:

(1) "Poor prior engagement with reading is viewed as by far the most significant barrier to engaging students with reading and writing" and that

(2) "Students' engagement with reading and writing could be improved through more time, better resources, parent involvement and earlier interventions" (McDonald, Miller, Cochrane and Linnane 2011, 15). The project, which linked together schools from Denmark, Italy, Romania, Scotland and Turkey used a range of different media to create digital artefacts about a range of different texts, including films, fiction, books, non-fiction books, games, TV programmes, DVDs, comics, and graphic novels. To do this they drew upon social media, websites, magazines, advertising, friends, books and music stores (McDonald, Miller, Cochrane and Linnane 2011, 18).

In general the project indicated that ICT could be used to improve the interest of students in learning and writing as well as increase their confidence. Using digital media such as online graphic novels or YouTube made lessons more fun and stimulating, not only by making them more interested in responding to the texts they had found, but also by giving them confidence to create texts of their own (McDonald, Miller, Cochrane and Linnane 2011, 19). This was the predominant viewpoint, but not the only one. An opposing one was that ICT could make no difference because, as one teacher stated "Nothing can change them". Some students also had negative experiences of the technology, both being frustrated that the in-school technologies did not function effectively and because of experiences of cyberbullying within the social networks they had used (McDonald, Miller, Cochrane and Linnane 2011, 163). The overall conclusion of the project

was, however, that "ICT and digital storytelling (offer) an opportunity to further develop and expand pedagogical practice" (McDonald, Miller, Cochrane and Linnane 2011, 19).

3.1. The role of social media in developing artefacts

3.1.1. Social media in education

Social media all provide platforms for communication and interaction, but do so in a variety of different ways. McLoughlin and Lee claim the affordances of social media platforms as:

> *Connectivity and social rapport: Social networking sites like MySpace, Facebook and Friendster attract and support networks of people and facilitate connections between them…. people acquire both social and communicative skills, and at the same time become engaged in the participatory culture of Web 2.0. In these spaces, youth engage in informal learning, and creative, expressive forms of behaviour and identity seeking, while developing a range of digital literacies. (McLoughlin and Lee, 2007; 667).*
>
> *Collaborative information discovery and sharing: Data sharing is enabled through a range of software applications, and experts and novices alike can make their work available to the rest of the online world, for example through their personal and group blogs. Social bookmarking tools such as del.icio.us, Furl and Digg allow people to build up collections of web resources or bookmarks (McLoughlin and Lee, 2007; 667)*
>
> *Content creation: Web 2.0 emphasises the pre-eminence of content creation over content consumption. Anyone can create, assemble, organise and share content to meet their own needs and those of others. … Wikis enable teams and individuals to work together to generate new knowledge through an open editing and review structure. (McLoughlin and Lee, 2007; 667)*
>
> *Knowledge and information aggregation and content modification: The massive uptake of Really Simple Syndication (RSS), as well as related technologies such as podcasting and vodcasting… is indicative of a move to collecting material from many sources and using it for personal needs. The content can be remixed and reformulated (the concept of a mashup). McLoughlin and Lee, 2007; 667)*

McLoughlin and Lee are claiming here that social media are intrinsically collaborative, and drive users towards co-creation of content. This is not the opinion of many observers, however. Even those who acknowledge the socially cohesive role of social media would contest that this social cohesion leads towards co-creation. Despite their central role in social media Facebook, SnapChat,

Instagram, Tumblr etc. all have images as a central part of communication. Lewis, Pea and Rosen (2010; 2 – 3), for example, concur that there is identity creation, and add community creation, around the sharing of these artefacts stating that "the artifacts we manifest in the world elicit new forms of social and material interaction that in turn give birth to new artifacts, conditions and consciousnesses. Around these we in turn organize social and productive life and find new aspects of who we are as humans – the makers and users of worlds of mediating symbols)".

The effectiveness of these platforms in supporting communication, community and identity are enhanced because artefacts are not just shared, but are commented on, and annotated, and further shared, and additionally, this is done rapidly and continuously. Narratives are created through comments on posts and become intertwined and develop while participants are synchronously logged onto the site. This is not only sharing, this is appropriating the images in order to represent a digital identity and by sharing creating a communal identity (Lewis, Pea and Rosen, 2010; 5). Furthermore, this is not only fast, it is frequent, participants engage regularly and routinely in this activity, with their attention directed towards either the most recent or the most popular posts. Thus not only is it true that "Participation is linearly routinized in a timescale of immediacy" (Lewis, Pea and Rosen, 2010; 7) participation is also rewarded through the assignment of popularity (the conferring of "likes") and status.

Scardamalia (2004) and Colasante (2010) both show how an annotation tool can encourage this participation and how an artefact, once constructed can lead to further engagement and learning. In these studies a Media Annotation Tool (or MAT) is used to enable learners to add meaning to the video artefacts they see, to provide what they refer to as artefact-centred learning (Colasante, 2010; 212). The advantage of this tool is that the discussion around the artefact remains centred on the artefact, overcoming the fragmentation that learners report as being dissatisfied with in other discussion-based platforms (Colasante, 2010; 213). Artefact-centred learning therefore provides coherence and convergence for collaborative learning. By placing these discussions actually on the artefact, the MAT also enables the learning to be placed in context, removing the need for

explanatory material and reducing the potential for ambiguity (Colasante, 2010; 213). Drawing further on the concept of reification described above, the annotations made can also provide a location for making abstract ideas around an image or sequence more concrete, by enabling elements to be textually tagged, negotiated and renegotiated. Artefact-centred learning therefore:

- Provides a focused location for discussion
- Provides a context for learning, providing required additional information in situ
- Enables reification of abstract ideas

Scardamalia discusses a similar process, but one in which information is linked in a variety of postings to a Computer Supported Intentional Learning Environments, or knowledge forum, in which objects in the form of text files, images and videos are posted and linked in a graphical form. This structure enables learning to

- Be created collaboratively
- Provide different perspectives on information simultaneously
- Enable people to participate in different ways, using the medium which they prefer
- Showed explicitly the interconnections between ideas, (Scardamalia, 2004; 4)

Having these artefacts viewable within the same environment and added to by others enabled further steps to learning in that they:

- Facilitated a common discourse
- Could be annotated by individuals or groups
- Led to synthesis and emergent ideas (Scardamalia, 2004; 4-6)
- Facilitated a "rising above" discourse, in which competing ideas could be merged i.e. "the most constructive way of dealing with divergent or opposing ideas is not to decide on a winner or a compromise position but

rather to create a new idea that preserves the value of the competing ideas while "rising above" their incompatibilities." (Scardamalia, 2004; 7)

Most importantly, however, it can be argued that social media are of value in fostering the degrees of trust that are essential in online collaborations. Research by Soetanto et al (2014) indicates that the key difference in the experience of students working offline as opposed to online is that if trust within a collaboration begins to fail, offline teams have mechanisms to re-establish trust, whereas online teams do not. Yet evidence dating back to computer-mediated communication in the 1990s indicates that creating social connections within an online environment can support trust. Rourke et al, 1999 gives examples of studies in establishing trust in online interactions that "27% of the total message content consisted of expressions of feeling, self introductions, jokes, compliments, greetings, and closures" and "the more one discloses personal information, the more others will reciprocate, and the more individuals know about each other the more likely they are to establish trust, seek support, and thus find satisfaction".

Social media can therefore support teamwork online by providing social presence, defined by Kawachi (2013; 21) as "a sense of camaraderie conveyed through mediated communications to others through sharing personal anecdotes, pictures, videos, audio and other media; connections suggesting shared interests, a fashionable lifestyle and friendliness." Student engagement is encouraged by feeling more part of a community and this active participation has been shown to lead to achieving higher quality learning; without student engagement online activity becomes de-contextualised. Student engagement, context and above all the trust that comes from sharing of personal details, and establishing of social links is therefore highly important for the success of collaborative learning tasks (Kawachi, 2013, 28).

This is particularly important for introverted students. In a study by Voorn and Kommers (2013) it was found that introverted students, who tend to state that social skills are less important for collaboration than do extrovert students, found

their self esteem increased through the use of social media to interact online when collaborating (Voorn and Kommers, 2013, 71). As Kawachi states:

> *The shy introvert student can look through webpages of other students, and then post up tentative own personal information; this-or-that photograph, these 'likes' and those music favourites. The personal data can be posted up gradually to test out through trial-and-error to explore how acceptable the data are to others (and immediately withdrawn if sensed to be outside the social norms of the group). Step-by-step in small safe steps, the introvert can thereby build up a socially-accepted online persona, through which she can interact with others online. In this way, the social media website can offer to the self-conscious outsider a mechanism towards*
> *becoming accepted by the community online. Once this has been achieved the group can move on together as a community later to engage group collaborative learning tasks (Kawachi, 2013; 28).*

3.1.2. Limits of social media

Where McLoughlin and Lee's claims are problematic is in the idea that this use of social media automatically leads to digital literacy, and by its nature encourages creation of digital content. Many users participate simply by appropriating pre-existing content, or commenting on others' uploads, or solely (or at least predominantly) lurking. It should particularly be noted, that none of the above examples enable the co-creation of content; the closest they are able to provide to collaborative production is the uploading and subsequent downloading and reversioning of content (in a constant remixing).

The constraint of these platforms in supporting construction of content is highlighted by Lewis, Pea and Rosen, and from the perspective of a teacher encouraging learning through constructionism, the fluency that users have with appropriating and re-presenting artefacts is far from a literacy with creation.

> *Harnessing such dynamic network interactions for learning is challenging in part … because the 'upload' mode of media production is so primitive from a creative meaning making perspective. Although these sites are certainly dynamic, those who study human interaction cannot help but notice that the forms of communication available are for the most part one-dimensional, based in collective circulation of artifacts and individual meaning-making, rather than the coconstruction of meaning…. Participation is tightly constrained, and its limited forms give rise to further [limited] expectations among users for what kind of contributions even count as 'participation'. (Lewis, Pea and Rosen, 2010; 6)*

The importance of this concept of dynamism in content creation is echoed by Bull et al (2008; 103) who define dynamic media as being fluid in "their technical characteristics i.e. media that is (sic) interactive, multilayered, and mobile" – as well as cultural characteristics - media that is (sic) remixable, sharable, and used as a springboard for social interactions."

Participation through the conferring of likes is "'participatory' in a confined sense" but alone it is not sufficient to the learning opportunities that constitute constructionist learning. As Lewis, Pea and Rosen (2010; 7-8) state:

> *Circulating a commodity does not make meaning; people need to be able to create together, to generate narrative, to share contesting ideas. The power of social media for learning lies not in its ability to offer individual expression anytime anywhere so much as in its yet-to-be-realized potential to foster collaborations, on a scale and in tighter time cycles than ever seen before.*

Ackerman (2011; 30) notes that young people are able to adjust their speech when talking to others and to modify instructions to match the perceived abilities of the people with whom they are communicating. By the age of four, children are aware that others can have a different viewpoint from their own. What is more difficult is to form an understanding that "viewpoints are lenses and that different lenses transform reality in specific ways" and so how another's perspective informs the way their mind works (ibid).

Fully understanding the links between social media and the development of content for learning is limited by the lack of published research in the field. One of the few is that by Lewis, Pea and Rosen who had a predetermined set of criteria for the interactions which they wished to promote with their learners. These were that they should

1) All take place using a mobile device
2) Be preferential in that the conversations are anchored in specific elements and the their inter-relationships and
3) Not privilege narrative linear stories over more fragmented and casual communications
4) Enable content to be remixed by any user in a multitude of ways
5) Enable the shared online narratives to snowball

6) Be embedded in a web-based environment. (Lewis, Pea and Rosen, 2010, 11)

The platform they found that fulfilled these criteria was an application called Mobltz that uses 'mobile media blitz' to create artefacts (2010; 10). Each "moblt" is an image, text, piece of audio of combination of these, and each element is shared with the community of learners and added to, adapted and re-ordered to make short sequences (Lewis, Pea and Rosen, 2010; 12).

A second study involved "Slowmation" (abbreviated from "Slow Animation"); a digital artefact consisting of a stop-motion animation that played in slow motion at 2 frames/second. These artefacts were created by preservice teachers at university to explain a science concept (Hoban, Nielsen and Carceller, 2010; 438).

Neither of these studies includes an analysis of the impact, simply recount the activities and the technologies used in the projects. Indeed, reflection on the quality of literature to date indicates a limited range of published material on these aspects however, and what is produced tends to be focused on STEM subjects (unsurprisingly as it within these subjects that constructionism and learning cycles began), at an undergraduate level (possibly as this is the environment in which the majority of academics work) and also tend towards more of the descriptive rather than the analytical.

However, there is some evidence of impact where undergraduate students have used their online discourse to create a user guide for evaluating online information (an e-artefact). Assessed work showed a significant statistical difference between an experimental group that had used online collaborative learning as part of a module and a control group that had not (Walton & Hepworth, 2013). The experimental group used a greater number of evaluation criteria more often than a control. There was also evidence that the experimental group's reflections on how they used evaluation criteria demonstrated a richer and more complex ability in how to make judgements about information (Walton & Hepworth, 2011).

4. The role of learning literature and reading skills in education

The National Literacy Trust (Clark & Rumbold, 2006) identified that being able to read for pleasure is one of the greatest indicators that someone can go on to acquire knowledge and understanding for themselves and be able to think about thinking. According to Clark and Rumbold (p.8) reading for pleasure can also increase:

> *General knowledge; better understanding of other cultures; community participation; a greater insight into human nature and decision-making.*

Fish's theory of popular texts focuses on the way a reader reacts to the text, he posits that the reader's reaction is more important than the text itself. A reader will interpret the text through the filter of his or her own experience. The reader is seen to be actively imagining and constructing the text as they read along, building up a picture of how the text would end. Fish (1980) believed that there was a psychological benefit that could be gained from reading 'popular' novels. The 'popular' novels provided escapism for readers but it was escapism within the parameters of the reader's own life – because the reader was interpreting the text through his or her own experiences.

Engaging with a short piece of functional text and engaging with a longer piece of nuanced text actually needs different skills (Brooks, et al., 2007). Extended reading is defined as a text that provides sustained reading with a number of pages that cannot all be read or understood in one sitting in a class (Keinhert, 2013).

Whilst investigating extended reading skills, it is necessary to compare and contrast the broad theoretical approaches that can be taken in learning to read. (Tracey & Morrow, 2012):

- the traditional view;
- the cognitive view;
- the metacognitive view.

The traditional view (Dole et al., 1991) of reading is also called the bottom up view (Nunan, 1991). This view of reading is that there is a sequence of skills the reader needs to acquire before they can achieve full comprehension.

Leading on from this is the cognitive view of reading, which was developed as a counterbalance to the traditional view (Dole et al., 1991); the theory puts forward that this model of reading is more concerned with interacting with text and reading contextually. Fluent readers do not need to read all of the words; they can contextually understand what word comes next by understanding the sense of the text.

The third view is the metacognitive view which is a synthesis of the two other views together but impresses upon us how much the reader is in control of understanding the text (metacognition). Flavell (1976) and Brown (1978) were the instigators of metacognition as an extended reading technique for children.

Tracey and Morrow (2012) define metacognition as a theory that emphasises reader interaction with the text to understand it and to make sure that it has been understood - in essence to make the reader more aware of their own thinking (thinking about thinking [Flavell, 1979, 906]) whilst reading. Tracey and Morrow state that fluent readers use metacognitive strategies and readers who are not fluent have less developed metacognitive skills. It is this metacognition that is needed in the learning allied with interacting with extended pieces of text to give the learners all round reading and understanding skills that they can then use in any situation.

5. Experience of partner institutions in the project

As stated above, a key part of the previous experience that the AMORES project aims to draw upon is that of the practitioners from the five schools involved in the project. To investigate this the survey of user needs (discussed in D1-2) also contained a request for information regarding their previous experience

of technologies. The responses from the schools are shown in Table 1. Country codes are used rather than school names.

The survey asked respondents for feedback based on categories of technology defined by their purpose, rather than by specific names. This was prompted by the categorisation table created by McLoughlin and Lee (2007; 666) and by colleagues' observation that the list was outdated. Any specific list of applications will suffer from the following issues:

Table 1. Technologies already used by the partner schools

	DK	HR	PL	SE	UK
VLE	Mindmeister	LinoIt (we have the interactive whiteboard for some classes)	All classrooms are equipped with technology and amongst our team there are teachers and IT experts who could help us. At the moment we use almost all technologies in our teaching. The older children have experience of collaborating online through projects such as Space Camp.	It´s Learning	Learning platform available but not yet rolled out to pupils
Web	Self-created wikis	Wordpress (our school journalists group publish online newspapers)		Don't do	Limited to certain year groups
Artefacts	PowerPoint, MovieMaker, Prezi, Slide Maker, Animoto, Tiki-Toki	Students create short movies in MovieMaker, presentation on Prezi and interactive and graphic blogs on Glogster.		Mac laptops and iPads using GarageBand, iMovie, Keynote, PhotoBooth	PowerPoint and MovieMaker
Blogging	No	Publish school online newspapers using Wordpress platform.		Don´t do (although a few teachers and classes do)	Not yet
Discussion boards	Possibly on intranet	no		Google Docs, It´s Learning	Sometimes on school website but again only certain year groups
Social networking	Facebook	no		Some teachers use FB to communicate with pupils, but the school has not adopted this	Not allowed

				practice as a whole	
Sharing documents	Dropbox. Intranet	Only share documents via e-mails.		It´s Learning	Internal drop box on RM system
synchronous	Skype	Students have been participating via videoconferencing for years and they use Skype, Adobe Connect and Polycom.		Some teachers and pupils use Skype	Not used

1) it will become rapidly out of date
2) it can be daunting for colleagues who have less experience of technology
3) it fails to capture local variants or proprietary software created by individual institutions
4) it is of secondary interest, as it is the usage to which the technology is put and the fact that these meet all the needs of students that is important.

A review of the technologies the schools used indicates a wide variation in usage across the schools. VLEs (Virtual Learning Environments also known as LMSes – Learning Management Systems) are the backbone of students' experiences of ICT at the higher education level, being the means by which learning content is stored and disseminated, assignments set and submitted, and class interactions continued online. However, within the schools only one, the Swedish school, uses a fully-functioning VLE called "It's Learning". The UK school is in the process of implementing one, the other schools reference systems that *can* be used for online sharing of content, but limited to specific artefacts, either images, videos and documents (Lino) or mindmaps (Mindmeister).

This lack of virtual learning environments is also reflected in the limited use of other potential platforms for online social collaboration. Discussion boards are only regularly used by the Swedish school, through their VLE. Though the Danish and UK schools have some examples of practice, this is limited. Facebook is the only social platform used (by Denmark) with some limited use in Sweden. Interestingly, social network platforms are not allowed in the UK school. Sharing of documents is

possible at all the schools, again facilitated by the VLE in Sweden, but through the intranet or DropBox at the other schools.

Although asynchronous online communication has not been a part of common practice at the schools, synchronous communication has been, with all of the schools except for the UK one having experience of videoconferencing systems such as Skype and the Croatian and Polish schools using it to support specific learning projects with students. The British school, although not being users of Skype, separately to this survey, expressed interest in pursuing this as a motivator for involvement in the AMORES project.

The creation of web artefacts has had limited use in the schools, the Danish school uses the creation of wikis and the Croatian schools use Wordpress for the publication of its school newspaper. However, it is in the area of creating digital artefacts in the classroom that all the schools have a wealth of experience. Most of these are oriented towards developing visual materials, either in the form of presentations (PowerPoint, Prezi, Slidemaker, keynote) or editing videos (iMovie, Moviemaker) or, quite commonly, using software that specialises in creating one from the other (Glogster, Animoto, Tiki-Toki, Photobooth). The Swedish school also uses a range of music-making software, often with the purpose of providing music to accompany the visual digital artefacts.

This means that, in the area of supporting *collaborative online* co-creation, the experience and technologies already in place are limited, and encouraging the development of practice in this area will therefore need more care and support to ensure it happens effectively. This will be explored further in the analyses of other deliverables. However, in the area of creating digital artefacts in an offline collaborative mode the schools are very experienced. Similarly, online synchronous communication is also something within the experience or high on the agenda, of all of the schools.

Referring back to Dahlsveen's storytelling model in figure 5 we can see in figure 6 how it is envisaged that students will create and share stories within the AMORES project. It is anticipated that the children will create and share the digital

artefacts using some face-to-face work with their immediate peers, but the sharing and re-mixing of artefacts between the schools will be done within a social networking space. The display of the stories could be done online before the videoconferences, but the immediate performance and feedback concerning the stories will be done within a synchronous environment such as Skype and it is this that is anticipated as being the main driver of the creation, as it is that the storytelling model identifies as the most empowering and engaging part of the cycle. Further feedback, and the continued meaning making from the stories would be continued within the social network spaces.

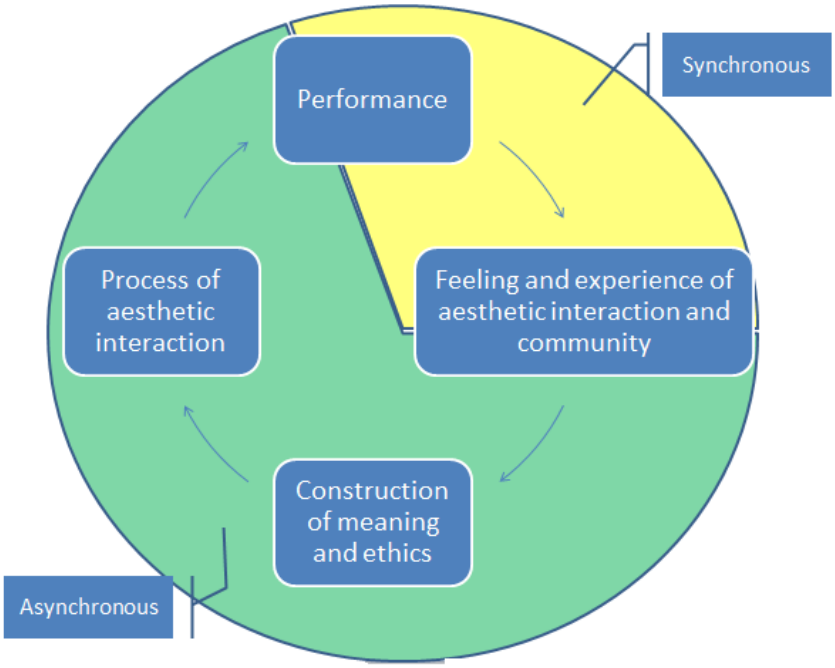

Figure 7. Heidi Dahlsveen's storytelling model, re-drawn to indicate resemblance to the experiential learning cycle and placed within the online technologies intended.

The role of the social networking spaces is therefore dominant in terms of time spent, if not dominant in terms of rationale for engagement. It is this that is also the area in which the schools have less experience. Supporting this within the schools is therefore a central concern of the project, and will be a focus of the online training and support within workpackages 2 and 3.

6. Conclusions

The aims of the AMORES project are evidently built on sound theoretical principles. Constructionist approaches stand at the top of the revised Bloom's taxonomy; that is *making things* incorporates all of the learning skills that comprise the thinking skills of lower ranks in the taxonomy.

Offering the opportunity for students to make things, not only provides them with novelty, it also offers the opportunity for reification, a focus on something to act as a medium for making abstract ideas concrete and negotiating their meeting collaboratively.

If the activities are structured effectively, through the creation process the learner can be taken through all of the stages of the Lewin/Kolb learning cycle. Creation of artefacts based on literature makes demands on the students to read around, explore more deeply and more conceptually, but simultaneously, the opportunity to create and use their imagination, provides the motivation to conduct these more complex tasks.

Creatively engaging with the curriculum also ensure that both the intuitive, open-ended thought processes and the closed-ended subject specific learning tasks are included, based around the development of the artefact (requiring a set of practical skills too). By offering flexibility in how the artefacts are created, students with differing skills and preferences can be engaged. Furthermore, if this learning process is made explicit, by asking the learner to reflect on their learning, and the creation process, then the metacognitive aspects of learning, particularly important when literacy and literature is being considered, can be brought into the learning mix.

Constructionism is not only about making artefacts, however, it is about creating them as a social activity. By locating the creation of these artefacts within a social media platform, this co-creation can be facilitated. Co-creation is a

difficult task when conducted offline, but online is even more problematic and therefore will need particular encouragement.

As has been noted earlier, reflection on the quality of literature to date indicates a limited range of published material on the use of constructionist techniques in an online environment in a school setting is limited and what is produced tends to be focused on STEM subjects. A project which focuses on literature, at the school level, and attempts to identify patterns of learning, best practice and guidance for implementing learning using learner-generated content therefore appears to be long overdue.

Within the later stages of the project, the following issues arise from the literature which will be taken forward to later activities.

- The artefacts created need to be in a medium that students will find engaging and creative.
- The environment in which the learners create their artefacts needs to have a strong social element and to facilitate annotating, remixing and mashing up of artefacts.
- Learning activities need to scaffold the acquisition of practical skills, managing the production of artefacts and incorporating the subject specific learning.
- Social activities need to be scaffolded to encourage online participation and co-creation, while simultaneously safeguarding the students.
- Learning activities need to engage with reflection to an extent appropriate to the age of the students to realise the potential for metacognitive learning.

These conclusions will lead into the following activities in workpackage 2

D2-2 the technology selection report

D2-3 the syllabus for teacher training

D2-4 the learning materials for teacher training

This literature review will also provide materials for the dissemination process, particularly in providing the range of theoretical underpinnings presented here. In addition, it is anticipated that drawing together these theoretical models, and looking at how storytelling and constructionism can be applied to an online environment, will provide a basis for other researchers to extend this work.

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