G8WAY: **Web 2.0 Enhanced Gateway to Educational Transition**

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A Common Pedagogy Framework for G8WAY

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Overview

1. Introduction

The G8WAY project is based on the idea that the growing availability of web 2.0 tools facilitates bridging this gap through learner centred and connective approaches, with a chance to more effectively manage educational transitions. Thus, G8WAY will develop web 2.0 enhanced learning environments, which will enable learners to reflect and develop creativity potentials and transitional skills in the light of their own and others' learning experience, made visible through a variety of media sets and Personal Learning Environment tools, each of them designed to meet the requirements of the transition envisaged, and all of which are mapped onto a single pedagogy framework.

G8WAY is examining three 'transition scenarios': school to work, general to higher education and higher education to work. For each of the scenarios a problem oriented concept and case based reasoning method will be developed and embedded into a web 2.0 learning environment. The project capitalizes on the work of previous projects, which developed e-tools to make visible informal competencies through media such as digital video and photography, digital cartoons, assessment tools and e-portfolios.

Rather than another example of technology advancement, G8WAY in our understanding is defined a means towards a pedagogy meaningful use of web 2.0. An essential aim of the project therefore is to build a pedagogy framework, which shall provide us with the theories, models, methods and instruments to reflect web 2.0 in the light of learning theory and practice and, from which we can derive informed decisions and criteria at the design and use of web 2.0.

In order to explore and take further the idea, the research team during the second phase of the project analysed a range of similar approaches, with particular regard to pedagogy frameworks and tools developed in order to map new learning technologies against pedagogy principles and learning characteristics. Through our discussion of the results it showed that the pedagogy frameworks proposed could serve as a baseline for our development process, however with some gaps to bridge. One of the main limitations might be seen in the fact that pedagogy frameworks often are bound up with the context they were designed for, and don't easily transfer to a different setting. Thus, the majority – if not all – of the pedagogy frameworks and mapping tools concerned are designed to function within a certain instructional design and curriculum, usually characterized by a highly formalized and well organized learning situation, such as a

course structure or learning unit. Consequently, the focus is on the technological enhancement of a given learning process and foundation of a new course (model). The major task then is iterated media comparisons to establish possible replacements or additions to the learning situations in a course and enhanced course models to establish which should be adopted, covering different criteria, as well as enablers and constraints. Last but not least, current pedagogy frameworks are designed to inform curriculum design and teaching didactics as well as reflecting educators' roles within the parameters of a formal education programme, rather than self-organized and distributed learning in open learning situations. Pedagogy frameworks so far imply a clear distinction of roles and functions related to a learning situation, which in the case of transitional learning can be rarely found.

To the contrary transition processes are highly diverse and complex, and above all open. That is why the wider context (social experiences, educational pathways, institutional contexts etc.) needs to be taken in account as well as personal strategies and motivations as they are mainly influencing the progress of young people on their way to employment. In particular, it is important to find out about the support needs of young people in transitions.

Therefore, a persona method was developed to be able to capture real life experiences, learning ways, challenges and needs in transitions. The method comprises the conduction of interviews with the target group in the partner´s countries. The case studies produced by partners served as ad hoc learning scenarios. Moreover, they allowed an insight into ICT usage and further needs which is valuable information for the platform to be developed. Through this method, it was possible to enrich theoretical findings with empirical data, finding out about key conditions for successful learning and about boundaries young people meet.

It is apparent that there is not any one right pedagogic approach to learning for transitions, just as there is not any one right web 2.0 tool or environment. The background on different individual undertaking transitions will vary considerably, the context and environment in which the transition takes place will also vary and different Web 2.0 tools can be used in different ways.

This we see a common pedagogic framework as an approach to understanding the context in which transitions take place and the potential pedagogic affordances of web 2.0 tools for teaching and learning. In this paper we have sought to explore such pedagogic affordances both from the point of learning and pedagogy theory and from the direction of designing learning activities. Rather than prescribing a particular

pedagogy, tool or platform, we have sought to illustrate processes of designing learning to provide a framework for the G8WAY project.

However the results allow for a comprehensive reflection of e-tools regarding their relevance in learning processes in transitions: Are they appropriate to the learning ways and strategies of young people? Do they address the needs the young people have? Do they address the gaining of competencies that are crucial to succeed with the labour market entrance?

The G8WAY project employs a set of basic concepts available through existing pedagogy frameworks, which however are further developed to meet the specific requirements of learning processes taking place during educational transition. The G8WAY pedagogy framework covers:

a. Pedagogic theories and approaches, which allow us to reflect learning in transitions and its implications for the design of web 2.0 powerered learning environments.

b. A methodology to reflect learning technology in the light of pedagogy theories and models as well as analyse and categorize learning technology with relation to its learning characteristics. Moreover the methodology serves as a basis against which to benchmark pedagogical principles for any particular learning scenario developed within the G8WAY project.

c. Pedagogical classification is understood here as tagging the learning tools and objects with schemes that characterize them according to the pedagogical standpoint that was used to create them, or to the actual pedagogical orientation of their constituent learning contents and activities.

d. Persona method, which will allow us to identify trends or patterns in user behaviours, expectations, motivations and experienced support in transitions in order to develop learning scenarios into educational transition.

The pedagogy framework will inform the building of learning scenarios, which describe learning activities in more depth with regard to the dimensions: **context** (aims, learning outcomes, pre-requisites, skills, subject, environment, time, difficulty or complexity), **learning approach** (theories and models) and **tasks** related (type, technique, interaction, roles, resources, tools, assessment etc.).

As for a) we will employ Conole's initial set of learning theories, and will explore in more depth the ideas of Vygotsky and how his educational theories can assist us in developing learning scenarios for educational transition. Within b) Grainne Conole's (UK Open University) recent work on pedagogy toolkits provides the baseline for further investigations into both, the pedagogy characteristics of new learning technology as well as the pedagogy implications of the learning activities, described with the help of learning scenarios. The function of c) is to check how coherent a given learning resource is with each of the elements in a set of guidelines for a concrete pedagogical standpoint. Each scenario can be described in terms of core learning activities, and the dynamic relations between its different elements. Pedagogical classification then enables us to reflect and tagging learning resources applied during a scenario context. As a matter of fact the G8WAY approach rather than instructional design, is concerned with open learning situations occuring along young people's transition pathways, within which different types of learning might come and go. In order to understand the variety of transition processes and experiences of young Europeans d) a story telling approach will be adopted to provide us with a richer background enabling us to develop scenarios and provide social software to support the transition process.

2. Challenges in Transitions

- Lacking job perspectives. Unemployment rates show that newcomers at the labour market are an especially strongly effected group.

- Destandardisation and Fragmentation. Life and carreer paths are becoming more diverse. Old biographical patterns lose their dominancy without other structures being in place already (Walther 2000: 54 et sqq.) Young people find it increasingly difficult to estimate how successful management of transitions can look like (vgl. Stauber et al. 2007: 7). They are faced with high expectations and calls for action, but at the same time are offered with less and less orientation for the arrangement of their job life entrance (standards, desirable status, time slots to keep in mind, interim solutions…) Instead of being able to follow predefined paths, they struggle at the sight of the diversity of options and their access restraints.

- Lack of knowledge on structures and opportunities. Support systems, learning and working opportunities are partly rich in the observed societies but lacking

structure and transparency, while partly they have been found incomprehensive and fragmentary. Individuals in educational transitions struggle to have access to information and to assess the information flood. This hinders the full exploitation of options.

- Barriers. Individual options are restricted firstly by external barriers such as different institutional standards and procedures (e.g. access, accreditation, interference of responsibilities). Barriers occur for example where access is restricted depending on the age, the place of residence, or the income of learners. Apart from external boundaries, there are individual barriers such as early dropouts, low education level, low resilience/ tolerance to stress and social disadvantages that limit the scope of choice.

- High competition level. The competitive situation on vocational and employment markets aggravates the integration for disadvantaged youngsters. In times of rising levels of education (education inflation) and narrowing chances even for graduates with the highest possible certificates, young people with low educational achievements are likely to be dispossessed by better qualified competitors, even if their own educational attainment is sufficient for the desired position.

- Dramatic changes in live spheres. Young people in transition are in a volatile situation: In order to take up a new education/job opportunity, they often move out from their parents and relocate to another town (which amongst others is complemented by dissolution of conversant social settings) and face the requirements of a new stage of learning/working quality.

- Extended influence of technologies (on all levels of life). Learning opportunities are increasingly linked to new technologies, but at the same time there is no equal access to them.

- Divide between formal education curricula and labour market requirements. When learning achievements from school/university are not sufficient for the job entrance, this might not only lead to hindrances in the transition period but also to inadequate employment (discrepancy of qualifications and the first job)

- Individualization of decisions and risks.

Required Competencies in transitions:

When looking at the demands regarding learning in transitions, one finds noticeable parallels to the model of key competencies – competencies that are uncoupled from concrete activities (which would be, for example, the knowledge of a welder regarding different welding technologies), but have comprehensive character (e.g. flexibility or self-direction). Without claiming to be complete, the following competencies from these models can be identified as transition requirements/transition competencies when reflecting the challenges and tasks in transition (see country reports):

- Creativity (creating own education and work paths)

- Critical assessment (of vocational education and employment options)

- Coping with boundaries (disappointments and failures in transition efforts)

- Communicating with others (peers and more knowledgeable others: Looking for and collaborate with supportive individuals, entering new, heterogeneous social spheres)

- Information literacy (ability to find appropriate information, awareness of diversity of job and training options)

- ICT Skills (ability to discover and make use of ICT tools in favour of the own transition process)

- Flexibility and adaptability (in vocational choices and decisions)

- Proactivity and responsibility (in transitions and related learning processes)

- Openness (towards alternative educational and job paths that match one´s profile)

- Decision taking

- Acting within the big picture (the own desired professional position)

- Conducting realistic life and career plans

- Activating social and institutional ressources

- Learning to learn (look for new learning ways e.g. in informal settings in order to building up relevant key competencies)

-      Cultural competencies (in order to exploit the potentials of globalizing educational and employment markets)

3. Pedagogy implications

a)   *Learning theories*

Following Conole's review of learning theories, such theories can be differentiated by their main focus:

Behaviourism	- Trial and error learning - Learning through association and reinforcement
Cognitive constructivism	- Focus on the processes by which learners build their own mental structures when interacting with an environment - Task-orientated, favour hands-on, self-directed activities orientated towards design and discovery
Social constructivism	Emphasis on interpersonal relationships involving imitation and modeling and joint construction of knowledge
Situated learning	- Learning as social participation - Shift from a focus on the individual and information-focused learning to an emphasis on social learning and communication / collaboration

b) *Learning cycles and stages*

Each learning theory can be broken down into the different elements of the learning process, forming the main focus. For example Dewey's theory is that experience arises from the interaction of two principles -- continuity and interaction. Continuity is that each experience a person has will influence his/her future, for better or for worse. Interaction refers to the situational influence on one's experience. In other words, one's present experience is a function of the interaction between one's past experiences and the present situation. For example, my experience of a lesson, will depend on how the teacher arranges and facilitates the lesson, as well my past experience of similar lessons and teachers. The following elements represent a loop of reflective learning:

Learning cycle of "reflective learning"
A real problem arises out of present experience (problem identification and definition)
Suggestions for a solution come to mind (gather all necessary information)
Relevant data are observed (reflection on information and experience)
and a hypothesis is formed (theory formation)
acted upon (tested)

Another example is Vygotsky learning theory, who claimed that we learn and develop meaning in two ways : a) Patterning (i.e. comparing what we currently see with past experience), b) Puzzling (i.e. developing explanations for things that appear to be confusing, incoherent, missing or contradictory). That is why "gap" analyses are more than just planning tools (i.e. how do we get from A to B), but also sites of important learning (i.e. why are we at A and not B, why do we desire B and not A ?). Activity theorists then placed these "puzzling" and "patterning" activities into what they called the "Cycle of Expansive Learning" and added this to the activity systems model. This cycle has four sites where the contradictions provide opportunities for Expansive Learning, entitled First, Second, Third and Fourth Order contradictions.
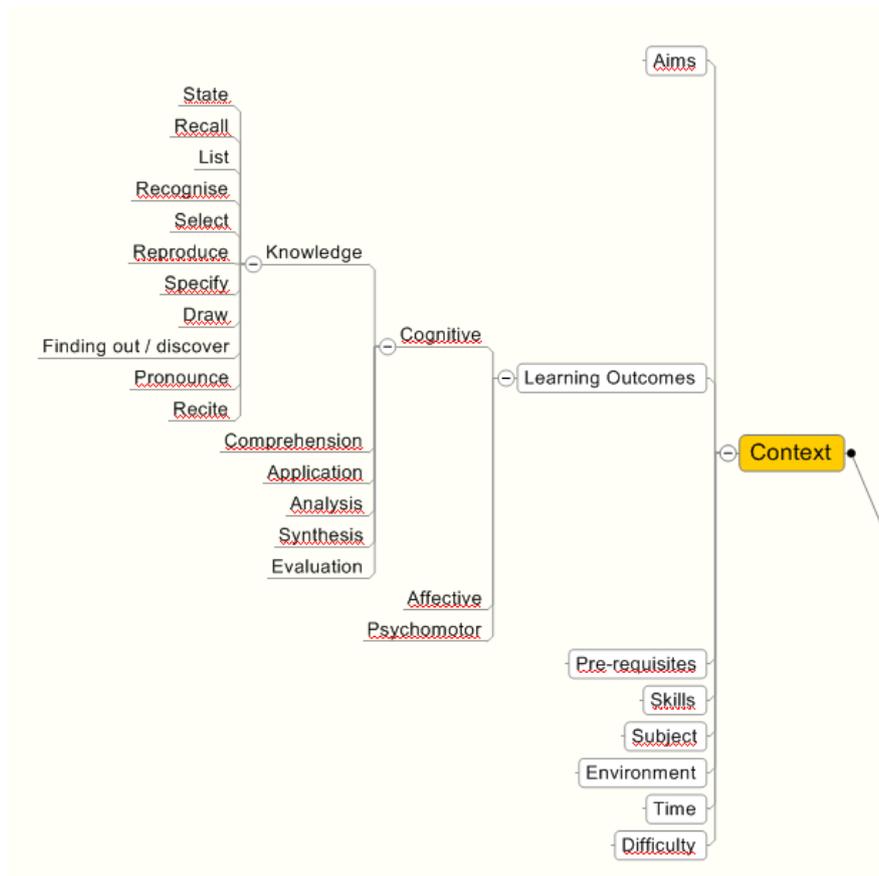
Learning cycle of "expansive learning"
First order contradictions: Present practice, in-need state
Second-order contradictions: Double bind, analysis and search for new solution
Formation of a new objective and motive, new model of activity and new tools
Third-order contradictions: Application and generalization, changing activity system
Fourth-order contradictions: the new system of activy, reflection and consolidation

The above examples are for demonstration only and can be expanded to a broader range of learning theories and models, relevant within the G8WAY developmental context. Noteworthy to mention the examples help us to understand the different stages assumed for a certain learning approach, which however must be complemented by descriptions of the learning activities making a learning cycle.

c) Learning activities

Learning activities might be explored in three directions: context, learning approach and tasks required. **Context** describes the aims, learning outcomes, pre-requisites, skills, subject, environment, time, difficulty or complexity of a learning task. The **learning approach** covers a set of theories and models underlying, while the **tasks** component relates to type, technique, interaction, roles, resources, tools, assessment etc. Breaking down the single components, we receive a more detailed overview of the different aspects of a learning activity.

Component: learning context

State
Recall
List
Recognise
Select
Reproduce — Knowledge
Specify
Draw
Finding out / discover
Pronounce
Recite

Cognitive

Comprehension
Application
Analysis
Synthesis
Evaluation

Affective
Psychomotor

Aims

Learning Outcomes

Context

Pre-requisites
Skills
Subject
Environment
Time
Difficulty

Component: learning approach
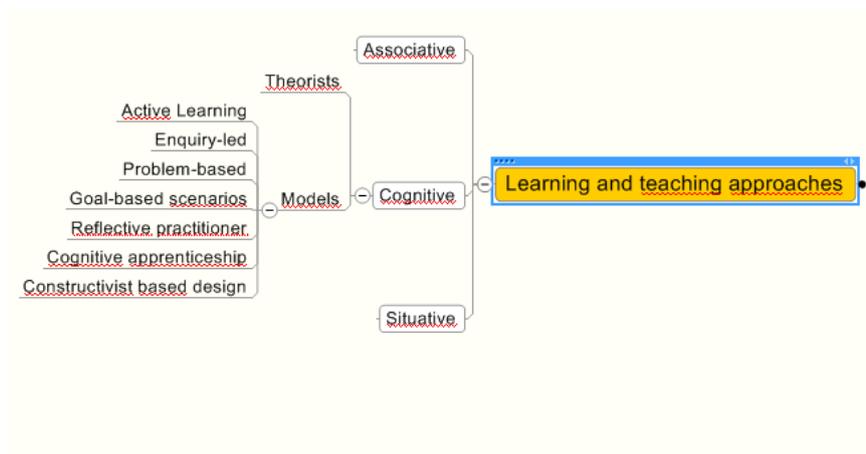
Component: learning tasks

type					
assimilative	**information handling**	**adaptive**	**communicative**	**productive**	**Experiental**
reading, viewing, listening	collecting ordering classifying	modeling, simulating	discussing, debating, presenting	creating, producing, writing, drawing, etc.	practicing, applying, exploring, investigating etc.
technique					
brainstorming, presentation, role play, structured debate, unstructured discussion, round, presentation etc.					
interaction					
individual, 1 to 1 learner to learner, 1 to 1 learner to tutor, group, many etc.					
roles					
individual learner, group member, mentor, facilitator, group leader, presenter etc.					
tools					
interactive	**adaptive**		**communicative**	**productive**	**narrative**
search, application	simulation		e-mail, forum, conference	spreadsheet database,	text viewers, image viewers,

			text creation, image creation,	audio players, video players
resources, sequencing …				

d) *Pedagogic theories and approaches to learning in transitions*

As for the G8WAY learning we propose to focus on activity based and socially situated learning, particularly based on the ideas of Vygotsky.

Vygotsky considered that all artefacts are culturally, historically and institutionally situated. "In a sense, then, there is no way not to be socioculturally situated when carrying out an action. Conversely there is no tool that is adequate to all tasks, and there is no universally appropriate form of cultural mediation. Even language, the 'tool of tools' is no exception to this rule. (Cole and Wertsch, 2006).

We are proposing to use social networking tools to facilitate learning in transitions. However it is important to understand that social networking tools are culturally situated artefacts. Engestrom says "the term 'social networking' makes little sense if we leave out the objects that mediate the ties between people. Think about the object as the reason why people affiliate with each specific other and not just anyone. For instance, if the object is a job, it will connect me to one set of people whereas a date will link me to a radically different group. This is common sense but unfortunately it's not included in the image of the network diagram that most people imagine when they hear the term 'social network.' The fallacy is to think that social networks are just made up of people. They're not; social networks consist of people who are connected by a shared object."

e) *Learning in Transitions and the Zone of Proximal Development*

Vygotskys research focused on school based learning. He developed the idea of the Zone of Proximal Development (ZPD) which is the gap between "actual developmental level" which children can accomplish independently and the "potential developmental level" which children can accomplish when they are interacting with others who are more capable peers or adults.

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In Vygotsky's view, interactions with the social environment, including peer interaction and/or scaffolding, are important ways to facilitate individual cognitive growth and knowledge acquisition. Therefore, learning presupposes a specific social nature and a process by which children grow into the intellectual life of those around them. Vygotsky said that learning awakens a variety of internal developmental processes that are able to operate only when the child is interacting with people in his (sic) environment and in cooperation with his peers. Once these processes are internalized, they become part of the child's independent developmental achievement (Vygotsky, 1978).

Vygotsky also emphasized the importance of the social nature of imagination play for development. He saw the imaginary situations created in play as zones of proximal development that operate as mental support system (Fleer, 2008).

Vygotsky tended to see the creation of a Zone of Proximal Development as a sequential process within schools. But the idea of the ZPD can be posited as also taking place in a non sequential and episodic manner within a workplace (Bachmair, Cook and Pachler, 2010). We can view transitions as opening a Zone of Transitional Development for learning in which there is a gap between the actual developmental level of an individual and the potential developmental level. Our aim is to provide support for realising that potential development level.

Vykotsky called teachers - or peers - who supported learning in the ZDP as the More Knowledgeable Other. "The MKO is anyone who has a better understanding or a higher ability level than the leaner particularly in regards to a specific task, concept or process. Traditionally the MKO is thought of as a teacher, an older adult or a peer" (Dahms et al, 2007). But the MKO can also be viewed as a learning object or social software which embodies and mediates learning at higher levels of knowledge about the topic being learned than the learner presently possesses. Thus for the G8WAY project social software could be seen as tools providing access to learning from experts or from peers through social networks.

The role of a Personal Learning Environment may be not only that of a tool to provide access to 'More Knowledgeable Others' but as part of a system to allow learners to link learning to performance in practice, though work processes. And taking a wider view of artefacts as including information or knowledge accessed through a PLE, reflection on action or performance may in turn generate new artefacts for others to use within a ZPD. Scaffolding learning may be a way in which this process can take place.

f) *Scaffolding learning*

Scaffolding was not a term originally used by Vygotsky, but is one of a number of somewhat similar ideas around learning which have come to be associated with Vygtotsky's ideas (Emihouza and Souza Lima, 1995).

"Scaffolding is a six-step approach to assisting learning and development of individuals within their zone of proximal development." (Feden and Vogel, 2006). Knowledge, skills and prior experiences, which come from an individual's general knowledge, create the foundation of scaffolding for potential development. At this stage, students interact with adults and/or peers to accomplish a task which could possibly not be completed independently. The use of language and shared experience is essential to successfully implementing scaffolding as a learning tool. (Feden and Vogel, 2006, cited in Dahms et al, 2007).

Dahms et all (2007) say that Vygotsky's findings suggest methodological procedures for the classroom. "In Vygotskian perspective, the ideal role of the teacher is that of providing scaffolding (collaborative dialogue) to assist students on tasks within their zones of proximal development"(Hamilton and Ghatala, 1994). "During scaffolding the first step is to build interest and engage the learner. Once the learner is actively participating, the given task should be simplified by breaking it into smaller sub-tasks. During this task, the teacher needs to keep the learner focused, while concentrating on the most important ideas of the assignment. One of the most integral steps in scaffolding consists of keeping the learner from becoming frustrated. The final task associated with scaffolding involves the teacher modelling possible ways of completing tasks, which the learner can then imitate and eventually internalise (Dahms et al., 2007).

Social media and particularly video present rich opportunities for the modelling of ways of completing a task, especially given the ability of using social networking software to support communities of practice. However, imitation alone may not be sufficient in the context of advanced knowledge work. Rather, refection is required both to understand more abstract models and at the same time to reapply models to particular contexts and instances of application in practice. Thus PLE tools need to be able to support the visualisation or representation of models (as Alan Brown has proposed through Technology Enhanced Boundary Objects) and to promote reflection on their relevance and meaning in context. Although Vygotsky saw a process whereby children could learn to solve novel problems "on the basis of a model he [sic] has been shown in class", in

this case the model is embodied in technological artefacts (although still provided by a 'teacher' through the creation of the artefact).

Within this perspective a Personal Learning Environment could be seen as allowing the representation of knowledge, skills and prior learning and a set of tools for interaction with peers to accomplish further tasks. The PLE would be dynamic in that it would allow reflection on those task and further ass to the representation of prior knowledge, skills and experiences. In this context experiences are seen as representing performance or practice. Through access to external symbol systems (Clark) such as metadata, ontologies and taxonomies the internal learning can be transformed into externalised knowledge and become part of the scaffolding for others as a representation of a MKO within a Zone of Proximal Development.

g) *Boundary Objects*

Vygotsky conceived of the idea of Zones of Proximal Development within a formal educational setting. The issue of identifying or creating potential Zones of Proximal Development may be more problematic within a workplace or transition setting. Ravenscroft (2009) suggests one approach is " the more spontaneous creation of a ZPD in response to a problem." Or, he asks, "do we set up less formal ZPDs, that are still identifiable as a ZPD, but less defined and rigid than Vygotsky spoke of." The idea of boundary objects may help in this respect. Boundary objects are another idea associated with Vygotsky and have attracted particular interest by those interested in Communities of Practice. The idea was introduced by Susan Leigh Star and James R. Griesemer (1989):

"Boundary objects are objects which are both plastic enough to adapt to local needs and constraints of the several parties employing them, yet robust enough to maintain a common identity across sites. They are weakly structured in common use, and become strongly structured in individual-site use. They may be abstract or concrete. They have different meanings in different social worlds but their structure is common enough to more than one world to make them recognizable means of translation. The creation and management of boundary objects is key in developing and maintaining coherence across intersecting social worlds."

According to Denham (2003) "boundary objects serve as point of mediation and negotiation around intent" and can comprise a place for shared work. Denham goes on

to say "Boundary objects are not necessarily physical artifacts such as a map between two people: they can be a set of information, conversations, interests, rules, plans, contracts, or even persons."

As a class of knowledge artefacts their importance may lay in their role in dynamic knowledge exchange and are "associated with process, meaning, participation, alignment and reification."

Whilst reports and documents may be considered boundary objects, they can also be seen as information spaces for the creation of knowledge. Mazzoni and Gaffuri (2009) consider that Personal Learning Environments may be seen as boundary objects in acting to support transitions within a Zone of Proximal Development between knowledge acquired in formal educational contexts and knowledge required for performance or practice within the workplace.

h)   *Supporting learning*

"Vygotsky recommended a social context wherein a more competent learner would be paired with a less competent one, so that the former can elevate the latter's competence" (Dahms et al, 2007). Dahm's et al cite Jaramillo (1996) in saying this social context promotes sustained achievement and cognitive growth for less competent students." They go on to say: "Accordingly, students need to work together to construct their learning, teach each other so to speak, in a socio-cultural environment. In-class opportunities for collaboration on difficult problem-solving tasks will offer support to students who are struggling with the material."

This could be seen to be problematic for non school based learning in assuming competence is related to the ability to master and internalise a given body of knowledge. However if competence in practice is seen as distributed throughout a community or organisation and knowledge is seen as dynamic in its development and application, the model would appear more relevant. A previous study of the use of ICT for learning in Small and Medium Enterprises in Europe (Attwell, 2007) found that workers used search engines to discover online communities related to their learning needs or interests. They tended to engage with communities where the knowledge levels were higher than their own but where the discourse and interactions connected with their own base levels of competence or knowledge. Typically participants would progress over a period of time from "lurking" to discover the rules of the community

and the basis tenets of the knowledge being exchanged to directly asking questions to supporting others in the community.

As well as participating in online communities, PLEs can assist in developing Personal Learning Networks, which can be seen as a socio-cultural environment for constructing learning and engaging with a 'more capable person' to support individual learning. Social software may also assist in allowing the discovery of individuals with similar learning needs or of those in an organisation or community with particular competence and knowledge which they are prepared to share.

It is also possible to develop models of how individuals might progress in their learning using a Personal Learning Environment. Engeström (1999), has suggested an ideal-type sequence of actions to be undertaken in an expansive learning cycle within a Zone of Proximal Development:

- questioning, criticizing, and rejecting some aspects of the accepted practices,

- analyzing the situation,

- modelling of a new solution to the problematic situation,

- examining the model,

- implementing the model,

- reflecting on and evaluating the process,

- consolidating its outcomes into a new, stable from of practice.

i) *Problem based learning*

Following Vygotsky's ideas, a scenario using problem based learning (PBL) and case-based reasoning (CBR) methods could be described as follows:

Goal One:

Identify problem and its context in order to give learners the meaningful learning experience as well as the authentic physical and cognitive environment.

The problem serves as a learning mechanism. The major challenge is to identify what are called learning issues, topics for further independent and group study. Problems are essential elements used to motivate and focus learners' learning. Problems should involve learners with the similar or same type of skills and activities in professional practice. In other words, problems should mirror "the same type of cognitive challenges" tasks as in the real world practice. Also, the problems should not be limited to one correct answer; they should be openended. In order to design realistic problems in real-world context, the three principles of problem design should be noted: relevance, authenticity, and complexity. Whether the process of solving this particular problem will optimize learners' problem solving and reasoning skills in the knowledge domain related to the subject matter determines the extent of relevance. Authenticity motivates learners to take up the inquiry process as well as promotes transfer of knowledge in future problem-solving situations. Moreover, authenticity also implies the opportunities for learners to take multiple perspectives into account while solving the problem. Most importantly, the problem must provide learners to experience a cognitive conflict so that they can recognize that they are not able to solve the problem with what they have known about the problems.

In practice this could mean 1) defining communication problems, essaying questions and making cases out of them. Here we emphasize the importance of the relevance to the content topics and the functions of the problem as a starting point of the learning process instead of as an end result of the learning process. 2) we can also start with identification of the objectives of the course, and develop a problem incorporating communicative skills and knowledge that learners are expected to learn in the statements of objectives. A possible schedule would like this:

- review / revision of the goals and objectives

- brainstorming of possible problems

- classification of the problems in terms of the skills and/or content topics with which the problems are associated

- selection of a tentative list of problem for use within a specific period

- o further definition of the problems by a subgroup from the main team of facilitators

- o presentation of the problem definitions to the entire team

- o further material development by the subgroup for each problem

- o presentation of materials to the entire group followed by serious review by a different subgroup

- o preparation of the entire problem "instructor's manual" by the subgroup followed by its distribution to instructors

We can start with identifying the problem solving tasks in the situated, real-world setting. This approach aligns more with the constructivist concept of learning as a process of enculturation. The emphasis is placed on the socio-cultural setting and the activities of the people within the setting. The premise underlying such design is that "learning is not an accumulation of information, but a transformation of the individual who is moving toward full membership in the professional community." Thus, the source of the problems should come from the real world, such as case history of a company, news or the experts in the field. Find out from the experts what the typical problems which practitioners would be likely to encounter in their career. The development of problems can be individual or team efforts. In order to identify realistic problems in real-world context, the following task analysis techniques are helpful.

Case Base Reasoning, which derives its theoretical support from memory organization and reminding in cognitive science uses prior experiences in the process of problem solving. It is argued that the acquisition of expertise is to accumulate experiences with a succession of real cases and to properly index these experiences for later retrieval. It is the aspect of collecting and organizing stories in designing that can be applied to task analysis. The techniques, such as structured interviews and surveys, are used to elicit knowledge from the perspective of a problem solver about the problem, the actions and the intention behind the actions in the problem solving process. In design of problem based learning, the data from such case collecting is particularly valuable for identifying different issues and factors in a problem. To embed those issues and factors into the problem can establish its complexity. Also, incorporating the tone of storytelling from different stakeholders into the presentation of the problem adds to its authenticity. CBR, as a learning model, promotes learning through cases. The access to old cases

generates the power of problem solving through the reasoning activities. This implies a potential instructional practice.

It is important to remark, that according to Vygostsky's claim that "mental processes can be understood only if we understand the tools and signs that mediate them", all those approaches should be clearly informed by mediation that gives the emphasis on placing learners in the relevant and authentic context for learning. The application of activity theory to task analysis is valuable in its exploration of the activity within the context and its emphasis on the intention and goal. Such analysis adds authenticity and meaningfulness to support the design of the problem-based learning environment.

Goal Two:

Identify alternative views and solutions to the problems to provide information resources

As it is mentioned in Goal One, CBR, as a learning model, promote learning through cases. CBR system is laid on the argument on the role of reminding, which coordinates past events with current events to enable generalization and prediction. Thus, problem solving can be viewed as a process of remembering a specific problem-solving instance, adapting its solution to fit the current situation, and storing that adapted solution in the memory. It is exactly the accumulation of the cases that demonstrates the acquisition of the expertise. Learning, in this case, means "extending one's knowledge by incorporating new experiences into memory, by re-indexing old experiences to make them more accessible, and by abstracting out generalizations from experiences". Therefore, it is thought to be useful to teach novices, who do not have much problem solving experience, by presenting stories of others in the problemsolving context. However, there are several design issues that we have to pay attention to in providing the cases as information resources.

In case-based reasoning, the degree of relevance of the retrieved case to the new situation is a crucial element to the reasoning process. Thus, the research on CBR is more concerned with the issue of indexing to form correspondence between the new experience episode and a previous one. The index is important because an index for a case allows a reminding strategy to recognize situations in which the case is relevant. Therefore, to use cases as resources in PBL, the designer needs to analyze the interrelationship between the cases and the problem at hand so that the cases can be presented with the relevant problem at an appropriate time.

Another design concern is how to help learners to reason through the cases while they are facing the problem situation. The theoretical support for the learning strength in CBR is derived from the ability of reasoning the old problem solving episodes to navigate the new ones. A problem solver or a case-based reasoner demonstrates reasoning ability in the process of interpreting and adapting the solution through analyzing the similarities and differences of similar cases. To refine the expertise in retrieving and adapting stored cases, Leake (1996) proposed to use introspective learning. Learners have to be aware of their own problem-solving process in order to become successful case-based reasoners. Also, it has been observed that learners who explain to themselves problematic aspects of worked example show superior problem solving. Better learners learn by constructing explanations to help understand the presented examples. Reimann and Schult (1996) suggested that a problem solver to

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take into account the rationale to the example solution when trying to relate it to a new problem-solving task. In other words, in order to learn successfully from examples, one must identify operator-goal relations, i.e. the problem solution steps to each other and to the goals those steps serve. All these propositions bring the design back to the focus on learners' own active construction of knowledge, and highlight the importance of providing learners opportunities to engage in reflective thinking in use of the resources.

In constructivist learning environments, such as PBL, the learning mechanism is not transmission of knowledge from one mind to another's; it is the interpersonal and intrapersonal construction of meaning making. Some common task analysis methods in use, such as learning hierarchy analysis, and information processing analysis seems to be out of picture in design of the PBL environment because they still views knowledge as a predetermined product, and aim to identify what to be taught which lead to how to teach and how to assess. However, those methods are still helpful in the design of PBL. It is the way of how we apply the results of such analyses in design needs to be changed. The results of those analyses should no longer serve as learning objectives or evaluation criteria to determine what to teach and how to teach. Instead, they could be used to identify information resources or tools that learners may need when they engaged in the problem solving activities. The same principle is applied to all the techniques of engaging experts in articulating their reasoning, such as their hypothesis, actions, plans, and interpretation when they solve problem. The identified knowledge base, thinking processes and problem solving strategies through those techniques no longer predetermine learners learning outcomes. They should be used to identify what information and tools to be provided to learners, and how to model the problem solving strategies and the thinking processes to support their learning. The issue here is the intention of control of learning. The reason about giving up the control is the premise that construction of meaning is tied to specific contexts and purposes. Knowledge is located in the actions of persons and groups, which is in a constant change. Such premise reveals the limitation of the knowledge elicitation methods in task analysis in the design of PBL. If we believe that knowledge constructs in the context, the analysis cannot take place without a context. Retrospections, verbal think aloud after task performance, and interviews all detached problem solvers from the original context. Observations and think-aloud during the task also have their limitation on the obtrusive effects. Another problem about knowledge elicitation is that most does not capture the group dynamic in action. If knowledge resides in social interaction, then analysis should capture that interaction in the process.

Goal Three:

Analyze group problem solving process and communication process to engage learners in discourse and reflection, and to provide teamwork guidelines to facilitate the collaborative process

Collaborative structure is a critical component in PBL. Four major learning advantages were recognized of collaboration: (1) collaboration distributes the cognitive load among the members of a group, (2) collaboration results in group's distributed expertise, (3) collaboration enhances reasoning and higher order thinking with challenge of different perspectives, and (4) collaboration facilitates self-reflection. The exploration of collaboration has mainly focused on under what circumstances collaborative learning is more effective, and whether collaborative learning is more effective than learning alone.

As information technology advances, the complexity of today's job has challenged cognitive task analysis to identify knowledge and thought processes underlying the job. Sometimes the solutions cannot even be identified beforehand. Today's jobs often require complex thinking and the solution of problems that cannot be stated explicitly in advance. They often involve groups of people with different knowledge and skills working together to solve problems. They sometimes involve use of intelligent systems, either as part of work teams or for training team members. Those systems require a much more formal and structure specification of the knowledge that is needed to be a coach or member of work team. The challenge has increased endeavors of cognitive task analysis in investigating issues such as team decision-making, team training, and team performance measurement. The unit of analysis is now group in action. The analysis focuses on the processes of (1) how the group communicates and coordinates to work together, (2) how the group learns from each other and adopt itself to move the group work further, and (3) how the group's knowledge can be captured in this continuous problem solving process.

Task analysis for teams differs from that of individuals in two major areas. First, this analysis must identify, define, and describe the cognitive processes and knowledge associated with teamwork processes (e.g. communication, coordination, adaptability). Second, it must be capable of addressing the issue of team knowledge.

In design of PBL, the concerns about group work include how to form groups, how learners should work in groups, how to assess group work incorporating individual accountability and team knowledge, and how the instructor should guide the group process and provide in-time support. The issues of how to work in groups and group assessment, specifically communication, team management, distribution and

collaboration of the tasks, and identification of team knowledge, can be better understood with the help of task analysis in team work. Research outcomes show, that solely using observations, think-aloud during the real time or interviews after cannot capture the interaction in team; therefore, they it is proposed to combine both a recording of all actions in the problem solving instances and a think-aloud protocol immediately after the problem session is over. The procedure means to capture cognitive processes in real-time, multiple-task demands. Aiming to create and maintain a shared team conceptual order, analysis focuses on identifying ways of coordination, competition of resources, and cooperation among team members. Such practice in cognitive task analysis about groups shed some light on "communication patterns and how they related to accomplishment of team goals" in design of group work for PBL.

Annett and Cunningham (2001) proposed a modified hierarchical task analysis to develop the measurement of team assessment. The hierarchical task analysis identifies three elements of performance: the task goal, the processes required to attain the goal, and an indication of error or attainment as a feedback loop. This classification gives us a conceptual framework to examine the continuous change of individual and team learning. For personal reflection, the learner should keep track on his or her goal of learning, describe his or her planning and evaluation of actions to be taken, and reflect the changes due to any input from the interaction with the learning environment. Group evaluation can take the same position to examine as a group the process of their goal setting, planning and the "input-action-feedback loop", i.e. goal-process-indicator. Moreover, this "input-action-feedback" does not only focus on the human capabilities, as the traditional task analysis does, but also on the physical, cognitive and social factors in the environment that learners interact with. Their awareness of such ecological structure in team performance is also revealed in their proposed components in their analysis of three constructs at the cognitive level: the world model, the people model, and the team plan.

Annett and Cunignham's Hierarchical Task Anaylsis (HTA), as described above, provides an alternative analysis framework, especially in design of the constructivist learning environments. Applied to the design of PBL, besides, to collect information from learners' observable behaviors and attitudes, the assessment can integrate information about the learners' cognitive model of the world, people, and team plan. Thus, the learners can understand their own learning process more and adjust the process if needed; the instructor can detect learning problems and provide in-time support. In other words, in design of PBL, this task analysis method can be used as guidelines for self-reflection or as an individual evaluation of group process to identify what they have

known, done, and achieved, and what they need to know, to and achieve, and what the consequences of the knowing and doing will be. Assessment becomes part of learning in the nature of continuity in social interaction. This method provides the constructive power that drives the feedback mechanism back to the team itself and self-regulate toward the goal. However, one issue about team performance still exists, i.e. what is the collective cognitive and social knowledge? How do we assess it?

Blickensderfer and her colleagues (2000) recognized the importance of identifying, defining and describing team knowledge in team cognitive task analysis. They made the distinctions about "pretask team knowledge", and "dynamic team understanding". They defined pretask knowledge as knowledge that exists in long-term memory, which consist of the understanding of the team 's objectives, teammate's roles and responsibilities, and teammate's characteristic as well as knowledge of the equipment, relationships among equipment, and task operation. On the other hand, dynamic team understanding is the team knowledge that develops when the team is actually performing the task; it is "the degree to which teammates develop compatible assessments of cues and patterns in the situation, the implications of these for the team and task, how the team is proceeding, and particular actions that certain team members need to take". If we examine the domains that this definition of team knowledge contains, similar to Annett and Cunnignham's HTA, Blickensderfer and her colleagues also recognize the impacts of the social domain of human capacities and the importance of ecological perception to human cognition. The analysis looked at the team as organism in relation to their environment. But, different from Annett and Cunnignham's HTA, the target of analysis in Blickensderfer and her colleagues' view has been shifted from an individual level to a collective one. It is the "shared knowledge" that consists of team knowledge, not an individual reflection or evaluation of the team performance. The reflection and evaluation need to be representation of team mind. The identification of such team mind, suggested by Blickensderfer and her colleagues (2001), can be tackled down from different information sources: the separate interviews of all team members, observations of the team performing the task, and examination of documents regarding to the team task. A goal-action analysis framework is applied to identify a team structure consisting of goals, means, and the relationships between goals and means. Then, a follow-up group interview should be conducted to validate and supplement the identified task structure. I applaud this utilization of the use of multiple sources to establish the consistency of analysis. However, I will suggest treating the group interviews and the observations of the team performance as the primary data to begin with the analysis, and then check again the individual interviews.

Thirdly, the relation between the different learning contexts resp. activity (sub)systems and their interpenetration has to be enroled in a analytical concept. Questions here would look like: How is informal learning typically located in social networks connected to non-formal and formal learning? How are competences valued through exchange between activity systems? How do objects, actions, tools and social norms transform in the course of exchange? What methods (see above) could be utilized in order to enable individual and group reflection on and active acquisition of communicative competences?

4. Excursion: the affordances of Web 2.0 and PLEs

There are changing ideas of how technologies can be used for learning, in part inspired by the emergence of Web 2.0 services and tools, but in part due to a critique of previous generations of learning software. Oliver (2002) points out that although many described instances of elearning claim to draw upon theoretical positions, such as constructivism, few explain how they embody the principles and values of that approach. Attwell (2008) has pointed to the difference between espoused pedagogies and the reality of the learning designs.

In part this may be due to lack of confidence and knowledge by teachers in pedagogic approaches to Technology Enhanced Learning. But it may also reflect the affordances in practice of Learning Management Systems and Virtual Learning Environments. Socio-cultural theories of knowledge acquisition stress the importance of collaborative learning and 'learning communities' but Agostini et al. (2003) complain about the lack of support offered by many Virtual Learning Environments (VLEs) for emerging communities of interest and the need to link with official organisational structures within which individuals are working. Ideally, VLEs should link knowledge assets with people, communities and informal knowledge (Agostini et al, 2003) and support the development of social networks for learning (Fischer, 1995). The idea of a personal learning space is taken further by Razavi and Iverson (2006) who suggest integrating weblogs, ePortfolios, and social networking functionality in this environment both for enhanced e-learning and knowledge management, and for developing communities of practice.

QuickTime™ and a
decompressor
are needed to see this picture.

Based on these ideas of collaborative learning and social networks within communities of practice, the notion of Personal Learning Environments (originally proposed by Scott Wilson as the 'Future VLE' – Figure 1, above) is being put forward as a new approach to the development of e-learning tools (Wilson et al, 2006) that are no longer focused on integrated learning platforms such as VLEs. In contrast, these PLEs are made-up of a collection of loosely coupled tools, including Web 2.0 technologies, used for working, learning, reflection and collaboration with others. PLEs can be seen as the spaces in which people interact and communicate and whose ultimate result is learning and the development of collective know-how. A PLE can use social software for informal learning which is learner driven, problem-based and motivated by interest – not as a process triggered by a single learning provider, but as a continuing activity. The 'Learning in Process' project (Schmidt, 2005) and the APOSDLE project (Lindstaedt, and Mayer, 2006) have attempted to develop embedded, or work-integrated, learning support where learning opportunities (learning objects, documents, checklists and also colleagues) are recommended based on a virtual understanding of the learner's context.

Personal Learning Environments are by definition individual. However it is possible to provide tools and services to support individuals in developing their own environment. In looking at the needs of careers guidance advisors for learning Attwell. Barnes, Bimrose and Brown, (2008) say a PLE should be based on a set of tools to allow personal access to resources from multiple sources, and to support knowledge creation and communication. Based on an initial scoping of knowledge development needs, a list of possible functions for a PLE has been suggested, including: access/search for information and knowledge; aggregate and scaffold by combining information and knowledge; manipulate, rearrange and repurpose knowledge artefacts; analyse information to develop knowledge; reflect, question, challenge, seek clarification, form and defend opinions; present ideas, learning and knowledge in different ways and for different purposes; represent the underpinning knowledge structures of different artefacts and support the dynamic re-rendering of such structures; share by supporting individuals in their learning and knowledge; networking by creating a collaborative learning environment.

Whilst PLEs may be represented as technology, including applications and services, more important is the idea of supporting individual and group based learning in multiple contexts and of promoting learner autonomy and control.

Personal Learning Environments offer both the framework and the technologies to integrate personal learning and working and to support learners in transitions. Connole (2008) suggests a personal working environment and mixture of institutional and self selected tools are increasingly becoming the norm. She says: "Research looking at how learners are appropriating technologies points to similar changes in practice: learners are mixing and matching different tools to meet their personal needs and preferences, not just relying on institutionally provided tools and indeed in some instances shunning them in favour of their own personal tools."

Such a development would appear to reflect the changing ways in which young people are using web 2.0 tools and social software for social and entertainment purposes as well as for learning.

Web 2.0 applications and social software mark a change in our use of computers from consumption to creation. Young people are increasingly using technology for creating and sharing multi media objects and for social networking. A Pew Research study (Lenhart and Madden, 2005) found that 56 per cent of young people in America were using computers for 'creative activities, writing and posting of the internet, mixing and constructing multimedia and developing their own content. Twelve to 17-year-olds look

to web tools to share what they think and do online. One in five who use the net said they used other people's images, audio or text to help make their own creations. According to Raine (BBC, 2005), "These teens were born into a digital world where they expect to be able to create, consume, remix, and share material with each other and lots of strangers." VLEs and LMS systems were designed as 'walled gardens', to isolate learners within institutional, class and subject bound groups and precisely to prevent the open social networking which characterises the ways in which we are using computers to communicate today.

It is not only that learners are using personal tools to meet their own needs and preferences, but teachers also. Whilst in the past, teachers would need technical support for software applications, the widespread availability of online environments and tools has allowed teachers to move outside of institutional VLEs. A wide range of different social software applications are being used for learning including blogs and wikis, social networks such as ELGG or Buddypress, mico blogging applications, shared presentations and social bookmarking tools. Some teachers have experimented with popular social networks such as Facebook for supporting learning. Many of these were not designed for learning and have simply been appropriated for that purpose. Other software vendors for instance Apple have developed learning specific areas such as iTunes U.

Recent research suggests that learners are moving away from desktop applications such as Word to use Cloud applications like Google Documents to save money. These applications also tend to offer enhanced opportunities for collaboration.

Furthermore the development of Open APIs allows applications to be embedded - thus it is possible to view YouTube videos, to access Twitter and to present slideshows all within a personal blog.

However these developments are not unproblematic. Not all institutional provision can be accessed through a PLE. Using multiple tools often means logging in separately to different accounts. There are issues around privacy, online safety and digital identities. Data created in one application may be difficult to move to another. Online cloud providers may go out of business arising issues of data preservation.

Above all there remain pedagogical issues. With a wide array of potential tools available how do teachers and learners choose the best tool for a particular task? Is it possible to look at the affordances for learning of different types of social software and group them? One major issue is the context in which such tools are being used. Later in this

report we will suggest ways of understanding the contexts in which learning for transitions is taking place and look at a framework for matching groups of tools to such contexts to facilitate the development of Personal Learning Environments. In the next section we will look at Activity Theory as a Framework for understanding in more detail the context in which learning takes place in transitions and the relationship between learners and their environment.

5. Storytelling and personas as a way of understanding transitions

Jerome Bruner (1996) has contrasted two ways of knowing: the narrative and the scientific. The former seeks to find a good story (which resonates with readers as life-like) while the latter seeks to draw out key concepts and ideas by abstraction and the application of logic. As one would expect of a research and development project much of the time, we operate within a formal scientific paradigm.

However, in order to complement this approach, we also intend to use narrative in order to examine actions, intentions, consequences and context. (See: http://www2.parc.com/ops/members/brown/storytelling/JSB.html John Seely Brown: 'Story telling' for more on this approach).

Scientific research seeks to draw out key concepts and ideas by abstraction and the application of logic (Bruner, 1996). In a holistic approach to understanding and meaning making storytelling and narrative can enhance such scientific enquiry in order to examine actions, intentions, consequences and context. (See: http://www2.parc.com/ops/members/brown/storytelling/JSB.html John Seely Brown: 'Story telling' for more on this approach).

A good story should be emotionally engaging, capable of application in different contexts and provide a broader framework for understanding generalities, partly because there is a certain looseness of ideas. Generalities in this sense are different from knowledge derived from abstraction: in this case learning and knowledge are the result of multiple intertwining forces: content, context, and community.

Following Brown (op cit), in purposeful storytelling people should get the central ideas quickly and stories should communicate ideas holistically, naturally, clearly and facilitate intuitive and interactive communication. Our intention therefore is use storytelling to enable us to imagine perspectives and share meanings about different educational transitions by conjuring up pictures more conducive to a culture of learning and development than a formal analytical presentation which is more in the form of knowledge transmission.

The G8WAY project itself is focused upon an abstraction: processes of transition. Further it fits within the enlightenment tradition of knowledge and learning being forces for good and the path to an improved future, both individually and at a societal level.

Obviously the main focus for the G8WAY project is an analysis of real-world transition practices, resulting in the development of sound general conceptual and pedagogical models for supporting learners in the transition process and ways to overcome barriers. This approach has considerable value but in order to understand the variety of transition processes and experiences of young Europeans a story telling approach could provide us with a richer background enabling us to develop scenarios and provide social software to support the transition process. We propose to tell our stories in the form of personas.

a) *About Personas*

Personas are fictional characters created to represent the different user types within a targeted demographic, attitude and/or behaviour set that might use a site, brand or product in a similar way (Wikipedia). Personas can be seen as tool or method for design. Personas are useful in considering the goals, desires, and limitations of users in order to help to guide decisions about a service, product or interaction space for a website.

A **user persona** is a representation of the goals and behaviour of a real group of users. In most cases, personas are synthesised from data collected from interviews with users. They are captured in one to two page descriptions that include behaviour patterns, goals, skills, attitudes, and environment, with a few fictional personal details to make the persona a realistic character. Personas identify the user motivations, expectations and goals responsible for driving online behaviour, and bring users to life by giving them names, personalities and often a photo. (Calabria, 2004)

Personas can be based on research into users and should not be based purely on the creator's imagination. By feeding in real data, research allows design teams to avoid generating stereotypical users that may bear no relation to the actual user's reality.

Tina Calabria (2004) says personas are relatively quick to develop and replace the need to canvass the whole user community and spend months gathering user requirements and help avoid the trap of building what users ask for rather than what they will actually use.

Here is a sample persona created by the Seventh Framework MATURE project looking at strategies for knowledge development and learning by careers advisors. This may be helpful to you in creating Personas or you can just skip to the next section.

Name
Andrew

Motto
No idea how I learned that - it just happened!

Education and professional background
Andrew has gained an off-the-job postgraduate qualification in career guidance, together with an employment based National Vocational Qualification Level 4 in information, advice and guidance (IAG). Additionally, organisational training also formed part of his induction. As part of his on-the-job training, there were opportunities to visit employers and research different sectors of the labour market.

Role / degree of standardization
Andrew has been working as a careers adviser for the last 3 years. There is little standardisation to his work as has to react to the needs of the clients.

Workplace / colleagues
He works in one secondary school helping young people with career decisions ensuring that they have the skills to make informed decisions. When not in school, he works in an open administrative central office with his laptop – hot-desking.

Learning
Andrew likes to learn and is keen to find out more about different websites which can help him further his knowledge of the local labour market.

Knowledge
Andrew has to continuously acquire knowledge in the form of national, regional and local labour market information. This includes: education, training and employment opportunities; occupational trends and forecasts; information on local employers etc. Over the last 3 years, Andrew has gained a significant amount of local knowledge about the labour market and the education, training and employment opportunities available. This knowledge has not be gained through any conscious process or training. It was considered as 'something you get to know'. As a new employee, Andrew asked questions of his colleagues to gain this information and knowledge. By reading internal communications sent by email and local newspapers he has been able to gain knowledge about the local labour market, which is central to his role, exemplifying his title as a knowledge worker.

Content types
He primary uses office software, email, the internet, organisation management information systems. Information can be received in both electronic and hard copy.

Structures
Information on clients is stored on a national MIS maintained by the organisation. Local intranets are available for storing and retrieving information.

Problem solving and other knowledge routines
The internet has become a valuable resource for researching and developing knowledge of the local labour market and the available opportunities. A favourite website, Planit Plus, has information on local opportunities and labour market information (LMI) and is often utilised. Email communication for colleagues also ensures that he is aware of current opportunities for training and employment in the local area. This soft data is vital to his work and needs to be continuously updated. Due to work pressures, he believes that in the current work climate there is little time to undertake employer visits to gain (and develop) knowledge about local employers. Time to research different sectors and gather LMI for analysis and synthesis is restricted and considered a luxury. Advantage is taken any opportunity presenting itself. Andrew recognises that he would value more time to develop his local knowledge by not only supplementing it with hard data, but also by returning to knowledge development methods used during his training and induction within the organisation.

Reaction to requests from colleagues
Requests for colleagues are normal by email and are usual a general query to see if he knows a particular piece of information. As a new employee, Andrew asked questions of his colleagues to gain this information and knowledge. By reading internal communications sent by email and local newspapers he has been able to gain knowledge about the local labour market, which is central to his role, exemplifying his title as a knowledge worker.

Communication strategy / approach to knowledge sharing
Serendipitous knowledge maturation – Knowledge sharing and maturing is ad hoc and haphazard. Knowledge typically developed and shared as part of a development process for a product or service within the organisation or as part of training. Over the last 3 years, Andrew has gained a significant amount of local knowledge about the labour market and the education, training and employment opportunities available. This knowledge has not be gained through any conscious process or training. It was considered as 'something you get to know'.

Formal training

He regularly has the opportunity to attend training courses run by the organisation and has regular review sessions with a line manager.

Important tools

Office tools, internet (including Planit Plus, organisational website), email, MIS

Motivation / drives / interests

Andrew is sceptical about some applications of IT and does not like to rely on them for information. He says it is unprofessional to go to the organisational website with a client to show them some information and then it freezes or is unavailable.

Task management

Andrew has no daily or weekly routine as he is reactive to client needs and requests. Task are managed by an electronic diary.

Attitude towards technology

He is keen to use technology and sees it as a way forward for many of clients in developing their research skills in locating local education, training and employment opportunities. Email communication is central to networking and finding out what is happening in the local labour market.

b) *Creating personas for G8WAY*

Decide on a research method

The purpose of the research is to identify trends or patterns in user behaviours, expectations, motivations and experienced support in transitions to form the basis of the personas. The best ways to gather this data is to talk to people having completed, or are currently undergoing, educational transitions. This might be through individual interviews or through a focus group or group discussion. You should explain to them first the basic aims of the project and that all information gathered will only be used for research purposes and will be anonymised (note in some countries / institutions you may have to get them to sign formal papers agreeing to this). The information we wish to know might include the following (see next page: Guideline for interviews).

Guideline for interviews

This should not be used as a questionnaire. We want to encourage participants to explore around the topic and reveal their motivations, frustrations etc. Therefore it is only a starting basis for the research. Questions should follow the natural course of conversation which is dominated to a great extend by the topics chosen by the participant and then should be complemented by the questions as they fit into it (My first experience shows that it helps to engage the person to speak about all stations in his transitions and then to pose questions along these stations).

Background

- Age

- Gender

- Educational / work background

- Social background e.g. have they moved away from home, do they work in a group, on their own, if they at school what is their planned future careers, if at university how long have they been there?

Transitions

- What transition are they currently undergoing (or have undergone), including specific details?

- What did they experience during this transition period?

- How did and do they perceive this transition, before and after it happened?

- What went well?

- What were the problems / issues?

- Did they get support – did they ask for support or was it a service available to them?

- Who provided support? (examples: employment agencies, teachers, friends…)

- What sort of support – was it providing them with information, with guidance, help with problem solving, mentoring or access to learning?

- how and where did they get that support – in school, in social settings, in work?

- How did it help – or did it not?

- What motivated them to get support?

- What kind of support would they have liked to have/ did they miss?

- What will they be doing next, which help are they looking for in order to be able to do it?

Information and Communication Technologies

- Did they use the internet for support in transitions?

- If so what did they use it for?

- What software did they use e.g. Google for searches, forums, web sites, social networks?

- What support did they find best for them?

- Which other internet tools can they think of/ do they know that can be supportive

- How proficient would they say they are in using the internet?

- What advice would they give us in developing the project?

Analyse research data and identify persona set

Interim analysis

This is a first analysis of three or four cases in order to provide the developer group of the Common pedagogy framework with ad hoc learning scenarios.

Write 3-4 short case studies along the method of writing personas (see 3.4). **Provide ad hoc learning scenarios,** describing one or two key learning situations (often resulting from problems or challenges faced) that the interview partner went through in his/her transition. You can identify those key learning transitions often by looking at particularly "rich" interview passages with very detailed and emotional descriptions of a situation or a problem and the strategies applied to solve it. Depending on the interviews, you may find three to four of these passages in each interview.

Try to keep the case studies to a maximum of **two pages per case**, while each of the ad hoc learning scenarios should not extend half a page.

Final analysis

For the actual development of persona: Review all the research data and look for patterns in attitudes and behaviours. For example, if you interviewed people about travel, you might find patterns like users who are price driven as opposed to quality driven, users who travel frequently as opposed to infrequently, and users who prefer to research their holiday rather than asking others for suggestions.

Whilst listing these patterns, you will begin to see clusters of attitudes and behaviours that make up different personas, such as the frequent traveller that is skilled in researching holidays and finding the best prices. This persona is motivated by keeping the cost of each holiday down so they can travel more in the future. The persona's goal is to go on as many holidays as possible.

Once you have defined these clusters of attitudes and behaviours, give each persona a brief description, such as 'independent traveller' or 'bargain hunter' (in our case, this name should relate to transition characteristics such as the way to solve transition challenges or the way of learning in transitions). There is no ideal number of personas, however try to keep the set small. **Three or four personas** work as effective design tools, whilst over ten personas may introduce the same confusion as a large user requirements document.

This means ideally you should try to talk to ten or so people in order to gain enough evidence for your persona. This could be through a focus group, through formal interviews or though informal chats.

Writing personas

Start writing the personas by adding details around the behavioural traits. Select details from your research, such as working environment, frustrations, relationships with others, skill level, and some demographics. Give each persona a name.

Here are some more tips to follow:

- The guideline questions can be a good starting point for the structure of the persona.

- Keep your personas to **one page**, so they remain effective communication tools and can be referred to quickly during design discussions.

- For the interim analysis, provide one or two **ad hoc learning scenarios** *for each learner interviewed*.

- Add personal details but don't go overboard.

- Include goals for each persona. This can include experience goals as well as end goals. An experience goal could be as simple as 'not to look stupid', whilst an end goal would be 'remain informed about the company'.

Once your personas are written, review them to ensure they have remained realistic and based on your research data. Check that you have a manageable number of personas, and if two personas seem close in behaviours and goals, see if you can merge them into one persona.

6. Mapping pedagogies and tools

a) *Toolkit and model*

Conole, Dyke, Oliver and Seale (2004), have proposed a toolkit and model for mapping pedagogy and tools for effective learning design. They say "Toolkits are model-based resources that offer a way of structuring users' engagement that encourages reflection

on theoretical concerns as well as supporting the development of practical plans for action (Conole & Oliver, 2002). The models that form the heart of each toolkit consist of representations of a 'space', described in terms of qualities, in which theories or approaches can be described." They emphasise that "the descriptions of these approaches reflect the beliefs of describer. These models are thus best understood as sharable representations of beliefs and of practice, rather than as definitive account of the area (cf. Beetham et al., 2001)."

The framework they propose consists of the following six components:

- Individual – Where the individual is the focus of learning.

- Social – learning is explained through interaction with others (such as a tutor or fellow students), through discourse and collaboration and the wider social context within which the learning takes place.

- Reflection – Where conscious reflection on experience is the basis by which experience is transformed into learning.

- Non-reflection – Where learning is explained with reference to processes such as conditioning, preconscious learning, skills learning and memorisation (Jarvis, Holford, & Griffin, 1998).

- Information – Where an external body of information such as text, artefacts and bodies of knowledge form the basis of experience and the raw material for learning.

- Experience – Where learning arises through direct experience, activity and practical application.

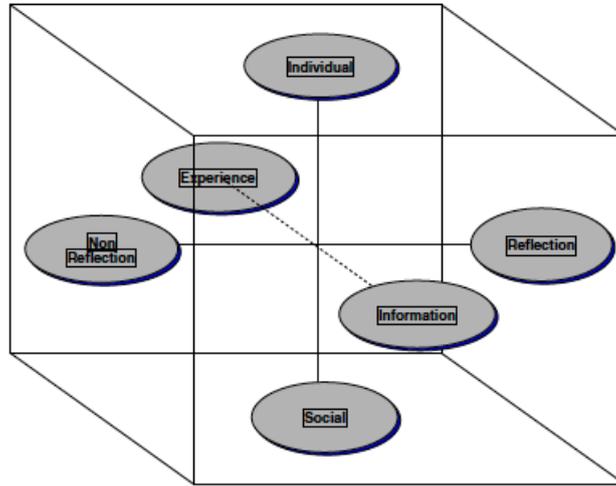They put forward three ways of representing the framework.

Fig. 1. Cube representation of the model.

The first is a three dimensional representation with a cube:

Tabular representation

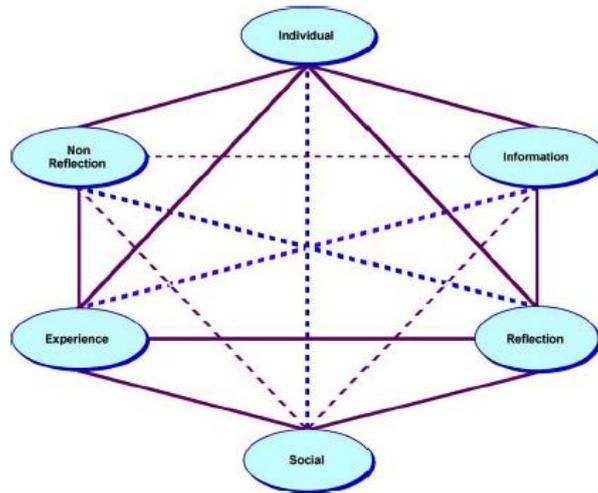| Information	---X---	Experience
Non-reflective	---X---	Reflective
Individual	---X---	Social

The second is as a series of continua:
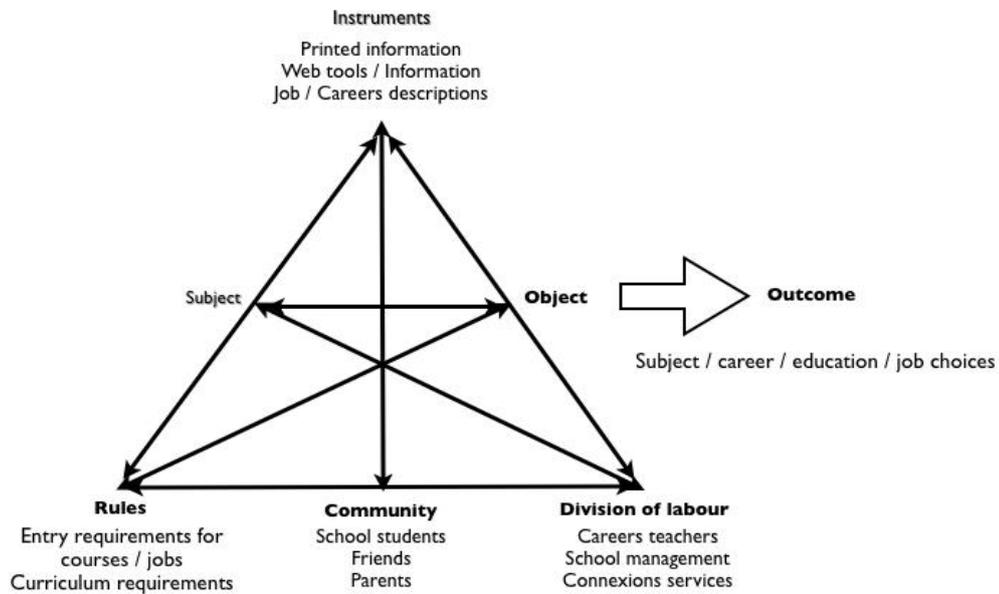
Fig. 2. Octahedron representation of the model.

The third emphasises the relationships between the ends of the spectrum in the form of a octahedron:

In the next section we will examine the transitions outlined through the Activity systems and then examine how a Vygotskian pedagogic approach can be mapped against the octahedron representation.

From this representation we will identify a series of mini learning activities to support the pedagogic approach for the different transitions and look at the social software tools that might support such learning activities.

b)   *An example of how to use the models and tools to support transitions using Web 2.0 tools*

For the example of how to use the models and tools we are going to look at the process of providing Careers Advice, Information and Guidance (CAIG) for school students in the UK. CAIG is provided both by school careers teachers and by the publicly funded Connexions service. The aim is to assist young people in making choices about subjects and future educations, jobs and career choices.

Instruments
Printed information
Web tools / Information
Job / Careers descriptions

Subject

Object

Outcome

Subject / career / education / job choices

Rules
Entry requirements for
courses / jobs
Curriculum requirements

Community
School students
Friends
Parents

Division of labour
Careers teachers
School management
Connexions services

The diagramme shows the context and environment in which the learning process takes place. There are a series of rules which govern future careers choices including course entry requirements, the different qualifications required for particular jobs and careers and school and university curricula provisions and requirements. In the UK there is a division of labour between those supporting students in careers transitions between school based careers teachers and the Connexions advice service. There is also some contradictions, given that school managements often wish to retain students within their institution. Research evidence suggests that school peers and parents are particularly influential in the choices young people make. The process is mediated by tools, which include access to job descriptions and printed information, Connexions web sites, services and tools and increasingly information which students themselves access through the internet.

Next we will look at the pedagogical model for 'traditional' careers guidance processes. Clearly this will vary from school to school and between different local authority areas.

However, it is possible to build an 'ideal type' model. This model is based on research undertaken through the European funded Mature project.

Students attend careers lessons from typically year 9 (?) onwards. The main activity in these lessons is to provide them with information. They also will often have one to one sessions with a careers teacher or year tutor to assist them in making choices about progression at certain points in their school life (this will usually be in years x and X, the first to make choices about post 16 education on completion of GCSE examination and the second in year X prior to taking A levels or vocational examination when looking for employment, applying to university or applying for training or a job. In addition, students may have individual or group session with Connexions Personal Advisors, although in the past period this provisions has often been focused on those seen as 'at risk' of unsuccessful transitions. Although as we have already stated communities play a large role in making choices, this lies outside the formal provision. And although the aim is to encourage students to be reflective about their career choices, evidence would suggest that this is a problematic issue. Thus in an Octahedron model traditional provision could be represented as follows:
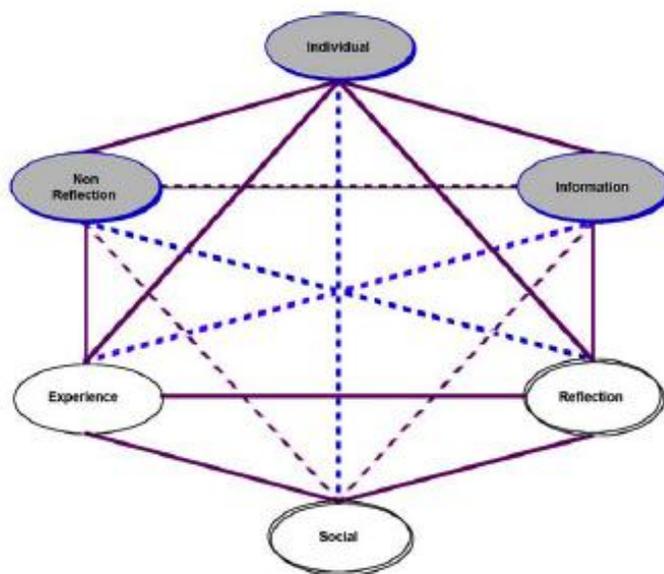

Present careers guidance is essentially individual and non reflective, focusing mainly on the provision of information.

Next we will look at a model or representation of a pedagogical approach based on scaffolding derived from Vygotsky. This is not to say that such an approach is the 'right' or even the 'best' approach to supporting transitions – but merely as we show a relationship between pedagogical approaches and theory and the design of activities to support learners in transitions.

According to Lindsay Lipscomb, Janet Swanson, and Anne West, Lange (2002) states that there are two major steps involved in instructional scaffolding: (1) "development of instructional plans to lead the students from what they already know to a deep understanding of new material," and (2) "execution of the plans, wherein the instructor provides support to the students at every step of the learning process." In an appropriate scaffolding process, there will be specific identifiable features that are in place to allow facilitation of assisting the learner in internalizing the knowledge until mastery occurs. Applebee and Langer (1983), as cited by Zhao and Orey (1999), identify these five features as:

- Intentionality: The task has a clear overall purpose driving any separate activity that may contribute to the whole.

- Appropriateness: Instructional tasks pose problems that can be solved with help but which students could not successfully complete on their own.

- Structure: Modeling and questioning activities are structured around a model of appropriate approaches to the task and lead to a natural sequence of thought and language.

- Collaboration: The teacher's response to student work recasts and expands upon the students' efforts without rejecting what they have accomplished on their own. The teacher's primary role is collaborative rather than evaluative.

- Internalization: External scaffolding for the activity is gradually withdrawn as the patterns are internalized by the students (p. 6).

In a Octahedron model such a process could be represented as follows:
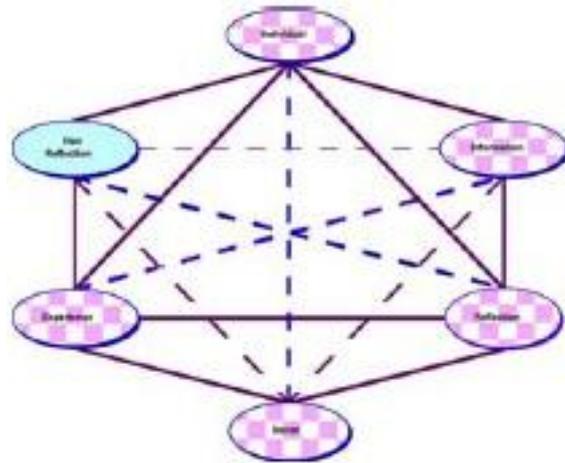
Thus in providing careers guidance we might be seeking to design learning activities which move from a focus on information provision and individual guidance to a more collaborative approach, to enhancing the intentions of the process and to activities which are appropriate to the learning goals and at the same time providing reflection in order to support the internalisation of the process of decision making for transitions.

The learning design toolkit (G. Conole et al., 2004) suggest six different iterative stages in designing learning activities:

1. Outlining the overall learning activity and associated learning outcomes.

2. Listing potential mini-activities.

3. Outlining the contextual details in terms of resources and constraints.

4. Mapping mini-activities to potential tools and resources.

5. Selecting mini-activities and tools and resources based on their contribution to the overall pedagogic theory.

6. Planning of the actually learning activity.

c) *Outlining the overall learning activity and associated learning outcomes*

We have already identifies the learning outcomes as students making informed choices about transitions in terms of future school, choices, further education and training, jobs and careers.

d) *Listing potential mini-activities*

Now we can brainstorm some mini learning activities which could support that outcome (this is just an initial list – there will be many more):

- Visit workplaces and education institutions

- Undertake job shadowing

- Undertake work experience

- Find out what people do in different jobs

- Reflect on what potential careers are interesting

- Find out about different pay rates for different jobs and careers

- Investigate out how other people ended in the job they do

- Look at what jobs are in demand now

- Consider what jobs might be available in the future

- Find out what qualifications are needed for particular careers

- Find out progression paths for different school subject choices

- Investigate how qualifications effect potential future earnings

- Look at where possible education and training opportunities are available

- Consider what qualifications you have and what you might need for a particular job or career

- Look at what financial support is available for education and training

- Work out how you will support yourself financially in future education and training

- Find sources of support and advice

e)   Outlining the contextual details in terms of resources and constraints

Resources and constraints will vary from context to context (particularly give the G8WAY being a multi-national project. However the overall framework for those resources and constraints may be derived from the rules and division of labour identified in the Activity Model.

f)   Mapping mini-activities to potential tools and resources

The next stage is to list the potential approaches, tools or resources that can be used for each activity. The G8WAY project aims to investigate the use of Web 2.0 and social software for developing a PLE to support transitions. The following list of possible tools is taken from the European funded Taccle project (Hughes, 2009).

Type of tool / what it is used for	What it does	Example of software (Open source when possible)
Blogging	A personal publishing tool which means any individual or group can publish on the web and receive feedback from others. Plug ins enable you to embed	Wordpress

	resources like flickr images, YouTube videos and Slideshare presentations	
Microblogging	Enables you to stay in touch and update your contacts on where you are and what you are doing	Twitter
Wikis	A collaborative tool for setting up easily edited websites which have content added and amended by readers.	PBWiki
Audio / Podcasting	Makes recording and editing sound files easy and allows you to encode your audiofiles as MP3 podcasts.	Audacity
Screen capture and screencasting	Instantly captures and shares images and videos.	Jing
Video hosting and sharing	You can upload and store videos using webcams, camcorders and mobile phones and allow others to share them. You can also search or browse videos made by others and comment on them.	YouTube
Presentation sharing	If you create presentations using Keynote or PowerPoint you can store them, tag them and share them on-line. You can make them availably publicly, privately, downloadable or not and can synchronise them with an audio file.	Slideshare
Social bookmarking	You do not need to store your bookmarks in your browser any longer. You can tag them, store them on-line and share them with others.	Delicious
Digital stories and slideshows	Using Powerpoint presentations and Flickr pictures, you can create an audio slideshow and audio comments can be	Voicethread

	left by others.	
Image hosting and sharing	Your personal or professional picture collection can be tagged and stored on-line and shared with others. Access and the facility to download can be controlled.	Flickr
RSS reader	Keeping up to date with your favourite websites can mean scanning many websites and blogs everyday. With an RSS reader you simply subscribe to the site's newsfeed and news of updates is delivered to you automatically.	Google Reader
Creating surveys	Set up a poll and embed the poll widget in your blog or website and then track the responses on a website.	Polldaddy
Graphics editor / bitmap editor	Allows you to manage digital images e.g by creating, resizing, cropping or recolouring images, combining images or by converting from one image file format into another	GIMP
Private social networking	Lets you create and customise a private network for a group of people (like a private FaceBook)	Ning
LMS / LCMS	Learning management systems and learning content management systems help to organize and administer learning programs for students and store and organize learning materials.	Moodle
Course authoring	Tools to create SCORM compliant training material that does not require you to be proficient in mark up	eXe

	languages like HTML or XML.	
Virtual worlds /augmented realities	Typically, you access a virtual world through the internet from a free client programme or viewer. As a resident of the virtual world, you present yourself as an avatar which is a 3D model representing the user's alter ego. Residents can explore their environment, join groups and socialize with people. They can use 3 – D modeling tools and scripting language to build objects and add functionality to them. In SL there is a virtual currency and land and other commodities can be bought and sold.	Second Life
live broadcasting	Very new technology that enables live interactive audio and video broadcasting to a global audience using just a camera and internet connection.	
Web authoring	Although blogging tools let you create a web page easily, web authoring tools let you develop more complex structure and appearance.	Nvu
On line meeting	You can connect people at a distance to an audio or video meeting from your computer. You can also use skype or telephone to connect them. Enables people to talk, see, use a whiteboard and annotate or share files.	Yugma
Web browser plus extensions	This is an essential tool and probably the basis of everything you do. Browsers like Firefox have hundreds of extensions which provide an enormous range of	Firefox Safari Internet

	functionality.	Explorer
Instant messenger and voice call	Skype provides a way of text messaging online contacts using your computer and also free computer –to-computer audio and video calls. You can also send files and set up group chats and calls. Low charges to make calls to landlines.	Skype
On-line calendar	Using an online calendar means it is easy to share with others – that makes scheduling meetings and other events easier.	iCal Google Calendar
On-line office suite	If you want to work on documents or presentations with your colleagues you can get on-line tools to create and edit text documents, spreadsheets and presentations.	Google Docs
Webmail	Instead of your e-mail programme being on your own computer and having to maintain it, your mail is received, sent and stored by a remote server that you log into. Web mail deals with viruses and spam before your mail arrives, provides you with free storage (up to a quota) and enables you to access not just your inbox but all your folders from any computer. Obviously, if you buy a new computer there are none of the usual complications of transferring your emails.	Gmail, hotmail
A personal start page	Aggregates your other social software (eg mail, RSS feeds, videos etc) into one place	Netvibes iGoogle

Mindmapping	For organising your thoughts, brainstorming and planning.	Freemind

The next table takes three of the mini-learning activities from the brainstorm above and provides four suggested means of representation through different mediating tools. Conole et al say: "Our previous research had shown that this approach combines the right mix of guidance and framing through illustrative examples, whilst also enabling personalisation and local contextualisation, which is a key underpinning philosophy of the toolkit approach."

Mini Learning activities	Potential means of implementation, using different mediating tools and resources			
Investigate out how other people ended in the job they do	Visit a workplace and interview workers	Invite speakers to a group session	Provide access to videos with different people talking about their careers	Provide information on careers pathways
Reflect on what potential careers are interesting	Undertake work experience or job shadowing and write about how you felt in a blog	Provide careers lessons about different jobs with outside speakers	Go online and rate different bobs saving them to a personal account	Provide written information on different jobs and provide individual interviews with careers advisors
Work out how you will support yourself financially in future education and training	Develop a online survey with past students from the school looking at expenditure and income sources	Invite university students to a group or class to explain their experiences	Provide an online simulation allowing young people to calculate their living needs and compare with potential	Provide access to an online forum with expert advisors

		income sources	

In the next diagramme with map the mini-activities against the three dimensions of the model.

Activity and online tools	Individual-social	Non-reflective.–Reflective	Experience.–Information.
Investigate out how other people ended in the job they do			
Visit a workplace and interview workers Blog or wiki to report on interviews	--------x--	-----x-----	--x--------
Invite speakers to a group session Podcast or wiki of visitors inputs	-----x-----	--x--------	--------x--
Provide access to videos with different people talking about their careers Mindmap showing different career pathways for different jobs	--x--------	-----x-----	-------x---
Provide information on careers pathways Online database of job descriptions with further careers	-x---------	-x---------	---------x-

information			
Reflect on what potential careers are interesting			
Undertake work experience or job shadowing and write about how you felt in a blog *Blog or eportolio*	--------x--	--------x-	-x--------
Provide careers lessons about different jobs with outside speakers Podcast or video of speakers inputs	-----x-----	--x-------	--------x-
Go online and rate different jobs saving them to a personal account Eportfolio tools for saving ratings	--x-------	--------x-	------x----
Provide written information on different jobs and provide individual interviews with careers advisors Could use online information with use chatroom or skype for interviews	--x-------	--x-------	--------x-
Work out how you will support yourself financially			

in future education and training			
Develop a online survey with past students from the school looking at expenditure and income sources *Surveymonkey*	------x----	-----x-----	----x------
Invite students to a group or class to explain their experiences Podcast or video of speakers inputs	-----x-----	-----x-----	-------x---
Provide an online simulation allowing young people to calculate their living needs and compare with potential income sources Simulation software. Google gadgets?	--x--------	--------x--	--------x--
Provide access to an online forum with expert advisors *Online forum*	--------x--	------x----	-----x-----

g) *Development of aggregate learning activities*

Conole et all say "Individual mini-learning activities (Actions) can be grouped into larger learning activities (Activities), demonstrating how this means of representation can

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support learning at a range of granularities …This compositing of learning activities also enables the practitioner to consider the overall pedagogical balance and the types of learning supported and emphasized."

This it is possible to examine to what extent the range of different learning activities provided allow for social interaction and for individual learning to take place, to what extent the learning practices pride for reflection and how far the learning practices are based on information or experience. In the case described earlier where we were seeking to move from traditional individual and information based careers guidance towards more reflective and social practices it would be possible to redesign the activities to use Web 2.0 tools to reflect that pedagogic move.

Activities can also be sequenced to provide scaffolding for learners in line with our earlier model example. In terms of using web based tools to support scaffolding, Kao, Lehman, & Cennamo (1996) postulated that scaffolds could be embedded in hypermedia or multimedia software to provide students with support while using the software. According to Lindsay Lipscomb, Janet Swanson, and Anne West: "They realized that soft scaffolds are dynamic, situation-specific aids provided by a teacher or peer while hard scaffolds are static and specific. Thus, hard scaffolds can be anticipated and planned based on typical student difficulties with a task.

They embedded three types of hard scaffolds: conceptual scaffolds, specific strategic scaffolds, and procedural scaffolds. The conceptual scaffolds assisted the students in organizing their ideas and connecting them to related information. The specific strategic scaffolds were included to help the students ask more specific questions and the procedural scaffolds were useful to clarify specific tasks such as presentations. Examples of these types of embedded scaffolds include: interactive essays, recommended documents, student guides, student journal, and storyboard templates."

Thus for example it is possible to develop a sequence of mini learning activities to support learners in careers choices for transitions, for instance as follows:

- Investigate a range of different job descriptions through an online database

- Watch videos of people explaining how they ended up in the job they are doing

- Rate different jobs and save them to own account / portfolio

- Select one or more jobs that seem particularly interesting

- Make a short written / audio / video diary entry of why these jobs seem interesting and share with others

- Discuss with a facilitator / advisor the presentation and how they can find out more about these jobs

- Interview someone doing these bobs / undertake work experience or job shadowing

- Record the experiences

- Investigate online sources of information on career pathways and education and training pathways towards that career

- Draw a mindmap of possible career pathways and progression opportunities

- Participate in online forum or online interview with students doing that education and training

- Use a simulation to find out about costs and possible sources of support for education and training

The role of the facilitator or advisor would be to support the student through those activities, pointing them to sources of information or learning and helping them in modeling their responses and learning strategies as well as in overcoming blocks to their learning. Of course different individuals will require differing levels of support and if using web 2.0 tools it must be remembered that levels of confidence and prior experience may vary greatly.

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