
Network of Excellence Professional Learning

PROLEARN

European Sixth Framework Project

D.6.8

SECI-inspired Business Models and Prolearn Sustainability

Editor

Paul Lefrere

Work Package

Business Models, Processes & Markets

Status

Final version

Date

6.2.2008

The PROLEARN Consortium

1. Universität Hannover, Learning Lab Lower Saxony (L3S), Germany
2. Deutsches Forschungszentrum für Künstliche Intelligenz GmbH (DFKI), Germany
3. Open University (OU), UK
4. Katholieke Universiteit Leuven (K.U.Leuven) / ARIADNE Foundation, Belgium
5. Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e.V. (FHG), Germany
6. Wirtschaftsuniversität Wien (WUW), Austria
7. Universität für Bodenkultur, Zentrum für Soziale Innovation (CSI), Austria
8. École Polytechnique Fédérale de Lausanne (EPFL), Switzerland
9. Eidgenössische Technische Hochschule Zürich (ETHZ), Switzerland
10. Politecnico di Milano (POLIMI), Italy
11. Jožef Stefan Institute (JSI), Slovenia
12. Universidad Politécnica de Madrid (UPM), Spain
13. Kungl. Tekniska Högskolan (KTH), Sweden
14. National Centre for Scientific Research "Demokritos" (NCSR), Greece
15. Institut National des Télécommunications (INT), France
16. Hautes Etudes Commerciales (HEC), France
17. Technische Universiteit Eindhoven (TU/e), Netherlands
18. Rheinisch-Westfälische Technische Hochschule Aachen (RWTH), Germany
19. Helsinki University of Technology (HUT), Finland

20. information – multimedia – communication AG (imc), Germany
21. Open University of the Netherlands (OUNL), Netherlands
22. University of Warwick (UW), UK

Document Control

Title: Business Models and Sustainability

Editor: Paul Lefrere

E-mail: p.lefrere@open.ac.uk

AMENDMENT HISTORY

Version	Date	Author	Description/Comments
1.0	14.2.2007	Paul Lefrere	A management overview of WP6 deliverables
1.1	28.11.2007	Paul Lefrere	First full draft
1.2	16.1.2008	Paul Lefrere	Version for review
1.3	6.2.2008	Paul Lefrere	Final version

Contributors

Name	Company
Ambjorn Naeve	KTH
Peter Scott	OOUK
Gunnar Martin	DFKI
Ralf Klamma	RWTH
Tapio Koskinen	HUT
Jacques Dang	HEC
Michel Klein	HEC
Volker Zimmermann	IMC
Richard Straub	IBM
Vana Kamtsiou	NCSR

Legal Notices

The information in this document is subject to change without notice.

The Members of the PROLEARN Consortium make no warranty of any kind with regard to this document, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. The Members of the PROLEARN Consortium shall not be held liable for errors contained herein or direct, indirect, special, incidental or consequential damages in connection with the furnishing, performance, or use of this material.

1	INTRODUCTION	5
1.1	Intended audience	5
1.2	Relevant ecosystems	5
1.2.1	The rise of the reputation economy	6
1.3	Constraints on ecosystems	7
1.3.1	Master patents – the Blackboard example	7
2	SUSTAINABILITY	9
2.1	The challenge of sustainability and Prolearn's approach	9
2.2	What affects perceptions of goals	10
2.3	One obstacle to NOE sustainability at scale: mismatches in roles	10
2.4	Another obstacle to NOE sustainability at scale: low interoperability	11
3	SECI-INSPIRED BUSINESS MODELS	13
3.1	Introduction to SECI	13
3.2	Integrative perspectives	16
3.3	From Drucker to business models for TEL	17
3.4	Significant opportunities	18
	SUMMARY AND SOCIETAL CONTEXT	20
	REFERENCES	22

1 Introduction

1.1 Intended audience

While the primary audience for this document is members of the Prolearn network, for whom it provides integration across work packages (notably with WP1, WP2, WP4, WP7, WP8, WP12, WP15), it is written to be accessible to wider audiences:

- The knowledge management community, interested in synergy-spotting in professional learning
- Members of Europe's TEPL and learning industries (who may find insights into business opportunities in new market segments) and universities and publishers (whose aim is to support the European academic community by making the TEPL aspects of scholarly publishing simpler)
- IPR researchers and TEL developers who need to be aware of some of the business models emerging in TEL or maybe applicable to TEL
- Leaders of other grant-funded networks and projects, with a need to become sustainable without grant support
- People interested in or researching in monetizing or otherwise exploiting the intellectual property created in TEL projects (Prolearn examples of which are listed in deliverable D.13.13_IPR), eg tools, services and processes that could benefit knowledge workers and knowledge-based organizations.

1.2 Relevant ecosystems

Companies increasingly use the metaphor of an ecosystem, and niches within it, to discuss markets and business models in terms of pseudo-ecosystems (henceforth called "business ecosystems" or just "ecosystems"). Audiences as listed above may belong to multiple and overlapping ecosystems, eg

- Ecosystems that are market-places (for career advice, training, mentoring, certification, recruitment, consultancy)
- Ecosystems that are for reputation management and networking (publishing, conferences, online communities of practice or purpose)
- Ecosystems that are all of one kind (eg higher education) but have different scales (eg small, meaning at departmental or group level within a single university; medium, meaning part of the entire higher education ecosystem in a single country; large, meaning part of the global ecosystem for an academic discipline).

Each ecosystem has its own business rules, resources, attitudes, drivers for change, etc. People within an ecosystem may be allowed to voice different views, or may have to adopt a consensual position. For example,

- An ecosystem may contain a group that favours for-profit business models, and another group that abhors them.

As wide as possible a range of business ecosystems should be taken into account in formulating or adopting any business models meant to meet broad needs. Care must be taken not to exclude major ecosystems from consideration without proper

cause (eg merely because they are unfamiliar or because they espouse views you do not share).

1.2.1 The rise of the reputation economy

People have multiple identities, at least one for each ecosystem they belong to. And often they want to maximize the visibility, kudos and opportunities that attach to their professional identities. This has given rise to what is called the reputation economy, which is relevant to all of the professional ecosystems listed above. (Other relevant economies include the attention economy, gift economy, and social responsibility economy.)

An example of the cross-ecosystem impact of reputation effects arose in the EC-funded FIGARO project (INFOSOC, 2002-6), in the context of academic visibility through scholarly publishing. The FIGARO case study was of Citation Indexing. In 1958, Eugene Garfield came up with Citation Indexing as a way to show the frequency of citations of professional articles, said by him to be an objective tool for measuring the visibility and impact of researchers. He set up the Institute of Scientific Information, ISI, to provide citation data. This seemed a small change. Science departments saw the reputational benefit from focusing on publishing in journals that would be measured. They rushed to subscribe to ISI, disregarding the change that the new focus quickly brought about and that many departments now regret: a staggering escalation of the prices of the key journals in their fields. To explain:

"In order to be able to practically handle this counting of citations, ISI defined a single set of core-journals, a few thousand titles, a small fraction of all scientific journals published in the world. Being in or out of the core set is determined by the impact factor, a citation index on the journal-level. And this changed everything. Scientific journals until then were mostly published by academies and learned societies. They were not very lucrative, were not meant to be, just cover costs. In the early 1960s, commercial interests realized that through ISI's citation hierarchy, scientific journals could be turned into a profitable business.

[And so to today]...The core set of 5-6.000 journals costs a library about €5 Mio per year. A 'must' for every serious university and research library. A 'cannot' for all but the richest libraries in the richest countries. ...complete disconnection from actual production costs... made possible by the revolutionary invention of the 'core journals'." ¹

The lesson here: minor changes to the working practices of individuals (members of the marketplace and reputation management ecosystems above) led to huge changes in the cost and complexity of other ecosystems they were part of (eg the library-user system, the emerging knowledge society), and generated enormous profits for some of the suppliers to those other ecosystems: scientific publishers who understood early the implications of having their journals in the ISI core set, and pushed to be included. The result: publishers achieved returns far beyond what their pre-ISI business plans assumed.

¹ Volker Grassmuck (2005). Pages 147-8 in FIGARO International Workshop "Intellectual Property Rights Issues of Digital Publishing – Presence and Perspectives", SCRIPT-ed, Volume 2, Issue 2, June, 142-163

The citation index, and the wider reputation economy, are so familiar to us as part of the knowledge economy that most of us do not take time to think about market possibilities inherent in reputation data. The Google co-founders (Larry Page and Sergey Brin) were exceptions; they identified the types of such data that were most significant for internet search, then developed their PageRank algorithm.

The fortunes created in cases like those have led to much more attention being given to ways to add value to data and to involve the whole community in providing that value (eg, through customer reviews and page views).

It is possible that today's ecosystems have within them the TEL equivalent of one or more ISI-level or Google-level opportunities. As with business in general, one challenge in TEL is to rise above day-to-day detail and see larger trends and needs, new or poorly-exploited markets, and constraints on markets (which conceivably could be side-stepped or approached in a new way, to give competitive advantage or to add value).

1.3 Constraints on ecosystems

Early deliverables in this work package (eg D6.1; subsequent consolidation and updating of that work in D6.8a; and desk research in 2007, eg ²) focused on one of the societal constraints on business models for knowledge-based products and services, including TEL: the law on intellectual property rights, IPR, in the EU and in other major markets.

As is well known, some forms of IPR can be awarded state-legitimized monopoly rights such as copyright. Patents are particularly problematic: it can take years between applying for a patent and being awarded it. TEL developers are not likely to track patent applications; so they will be unaware of a patent application until it is awarded. They may then find that the patent holder can determine who can use its IPR, for what purposes, in what ways, where, and at what cost. The consequences for developers or users of tools, products or services that infringe the patent may include being required to stop their activities, pay retrospective royalty payments and pay damages. Holders of the more significant patents often have backers with deep pockets, well able to pay the legal costs of defending a patent, and willing to do that because their business models assume large payments as above.

1.3.1 Master patents – the Blackboard example

In 2006, the U.S. Patent and Trademark Office granted U.S. patent 6988138 to Blackboard ³, a company whose investors include Microsoft. Similar patents were issued in all of TEL's major markets globally ⁴. Those patents provide a monopoly until 2022 on "technology used for internet-based education support systems and methods", meaning TEL products, processes and services that differentiate between the roles of teacher and student.

² Intellectual property rights of e-learning courses: a European comparative analysis. Michel R Klein, Sol Picciotto and Marie-Christine Janssens (Eds). Book draft. Background material for a Prolearn presentation at HEC, Paris, 7 December 2007.

³ US patent 6,988,138, <http://patft1.uspto.gov/netacgi/nph-Parser?Sect1=PTO1&Sect2=HITOFF&d=PALL&p=1&u=/netahtml/PTO/srchnum.htm&r=1&f=G&l=50&s1=6988138.PN.&OS=PN/6988138&RS=PN/6988138>

⁴ <http://www.blackboard.com/company/press/release.aspx?id=887622>

After a filing by the Software Freedom Law Center, in 2007 the U.S. Patent and Trademark Office decided to re-examine Blackboard's U.S. patent. The outcome (a decision to confirm the patent, or narrow it, or revoke it) should be known by 2009. The viability of many TEL business plans may depend on the decision. That is the significance of a master patent such as the Blackboard one: it is fundamental and far-reaching for its industry and should be figured into sustainability and business plans.

2 Sustainability

2.1 The challenge of sustainability and Prolearn's approach

Funding agencies around the world often find that after their financial support for a project ends, nothing substantial is in place to ensure that the project findings are disseminated and exploited, or to help work to continue on that project, if needed. The principal investigator moves on, aiming to win grants for new projects (these are more valued by institutions than continuation funding); and the project team disperses or moves to the new projects.

By contrast, a Network of Excellence, NOE, has more to hold it together, post-funding, either in its original form or as a coherent subset of a larger group. Reasons for this include:

- *Shared interest in reputation management.* A professional community brings kudos to its members if it has high prestige, eg if its members include the most highly-cited in their field; if it is elitist; and if it has lavish support for its activities, preferably from multiple sources, each itself of high status. Pre-internet, it could take decades for a community to acquire such a privileged status. In principle, the EC's initial funding could enable a new network of researchers to quickly achieve the highest levels of recognition. But for this to happen, those researchers must work to that end, after the seed funding ends. If they cannot then get support from other sources or cannot agree on what should happen next, this undermines their reputations.
- *Other shared goals, which lead to "Social glue".* Meeting new people in a NOE can lead to many congenial and productive professional relationships, which people wish to sustain, deepen and extend. If the driver for those relationships is high-level (eg a shared vision, a strong belief in the value of a field), rather than low-level and instrumental (eg "getting a grant for travel"), there will be much evidence of efforts to maintain those initial NOE activities that are visionary and issue- or problem-focused, and to establish new ones.
- In Prolearn these factors can be seen in use in Sustainability deliverables:
 - o D9.8 (which describes three major events that Prolearn has brought into existence, the EC-TEL academic international conference on technology-enhanced learning, incorporating the PROLEARN Doctoral Consortium, the Professional Training Facts, PTF conference for business and professionals, and the PhD Summer School)
 - o D10.10 (about other aspects of Prolearn).
- Further research is a strong component of the activities set out in those deliverables, for example to develop a long-term research agenda to explore integration between work packages WP 1, 2, 4, 7, 8, 12 and 15.
- Another important nuance of Prolearn sustainability deliverables is their implicit recognition of the importance of motivating members of a NOE to value their membership. The more value they feel is in membership of the NOE, the more they will use it, hence be visible, creating value for others.

2.2 What affects perceptions of goals

A business model makes explicit or implicit assumptions about what drives and influences the behaviour of those involved (eg users, partners, competitors).

Like a business model, statements about how to achieve sustainability need at some point to be correlated with any assumptions about the perceptions, motives, roles, actions and commitment of the people who will be involved in making it a reality.

Perceptions of the goal of NOE sustainability will vary according to:

- The size of the overall goal (does "sustainability" mean staying at the present scale, or expanding if demand is there?)
- The desirability of those benefits to someone (taking account of the opinions of others whose views matter to that person)
- How those benefits relate to the perceived opportunity costs of striving to achieve the benefits
- The perceived chances of success given the starting point and the resources available.

To put this simply, the effort put into striving to achieve "sustainability" will be higher if it is seen as achievable, and as worthwhile.

All of those factors can be modified, eg through social pressure or, more ethically, by finding ways to make the goal of sustainability more achievable, eg

- By systematically reducing technical, social and other obstacles to collaboration between members of the NOE who are located in different sub-systems (sub-systems) within the whole NOE
- By increasing the reputational and wider economic benefits of membership of the NOE, hence attracting new NOE members who can contribute to so-called Experience Effects, enabling all members to achieve more. Trust-based examples include sharing the text of successful past research bids (the best practices to be found in such documents represent a kind of 'trade secret'), and sharing ideas, contacts, opportunities, staff and tools.

2.3 One obstacle to NOE sustainability at scale: mismatches in roles

In the short term (2 years), there is a good fit between the skills and resources of Prolearn activity leaders, and the type and size of the demands they face in running their activities (eg, as set out in D9.8 and D10.10). And Prolearn has many postgraduates who can be relied upon to volunteer to staff NOE events and to help with the two journals that Prolearn members are launching: the IEEE Transactions on Learning Technologies and the International Journal of Technology Enhanced Learning.

In the medium term (3-5 years), a mismatch of roles may appear. Academics are likely to find that the NOE needs to be run as a portfolio of businesses, but with scaling problems starting to emerge. Demand for some Prolearn activities (eg conferences) will increase substantially. At that stage, the businesses will have reached a stage in their life that requires considerably more management input (to determine how to refresh cash-cow businesses such as PTF and EC-TEL, how to

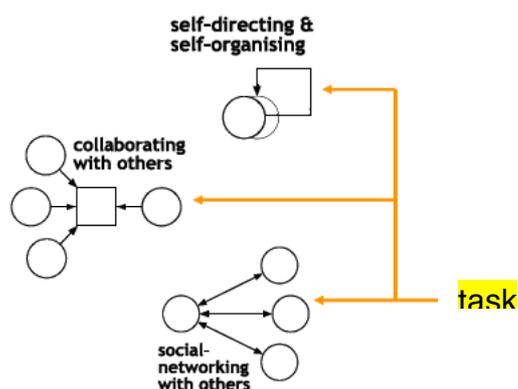
establish new businesses that complement PTF and EC-TEL, how to cross-subsidize areas that may need subsidy (eg PhD training for students from new member states). This is likely to take up more of the voluntary time of each academic or postgraduate than they can easily spare. So either Prolearn members will have to bring in people better able to fill a revenue-related role, or they will have to free up time for their commercial responsibilities, by reducing the proportion of their work that is research.

The above dilemma faced researchers whose research led to establishing a TEL conference that eventually outgrew the space available at the host university. That university lacked some of the facilities to run businesses, and its accounting system could not carry over profits in the manner of a business. The researchers let it go commercial, and became advisors to the company that took over its organisation. It became OnlineEduca, now the largest TEL event.

Prolearn is unusual in having a good number of industry members. They have helped the academic members to take such scenarios and experiences into account as they consider when and how to bring in the higher-level commercial competencies and occasional access to capital that a NOE must have if it aspires to work at scale, in which case it may need to raise €millions annually through its own initiatives.

2.4 Another obstacle to NOE sustainability at scale: low interoperability

As part of its work, the EC's iCamp project (some of whose members are in Prolearn) looked at some of the data-sharing barriers to achieving a shared goal (here, the sustainability of a NOE). It is important to minimize any frustration-creating / productivity-destroying incompatibility between the subsystems (or subsystems), which in Figure 1 correspond to the following activities: collaborating with others, social networking with others, self-directing and self-organising.



“Interoperability is a property that emerges, when distinctive information systems (subsystems) cooperatively exchange data in such a way that they facilitate the successful accomplishment of an overarching **task**”

(Wild & Sobernig, 2006)

Figure 1. Interoperability as applied to NOE subsystems

The activities shown in Figure 1 are of course ones that Prolearn has given much attention to, and so the tools and business processes explored in Prolearn could be very helpful to any EC-funded projects whose sustainability plans are made less viable by interoperability problems.

Another aspect of iCamp is relevant here: its vision of TEL, which was originally developed for teaching and learning but includes collaboration as in a NOE.

According to iCamp, we are seeing a shift:

- From low-interoperability, hence fragmented, *traditional* ways of working (labelled in iCamp as "TEL 1.0", which in teaching means single-learner, content-based, self-paced models)
- To higher-interoperability *emergent* ways of working (labelled in iCamp as "TEL 2.0", which in teaching means multi-learner, multi-tool, activity sequences).

This shift is likely to lead to greater use of semantic models [eg as in LISL] and to explicit mapping of activity structures. Thus: in a NOE, "learning situation" can map to the "team building phase". In that case, "activity" maps to "getting to know each other", "action" maps to steps such as "compose self-description", "view self-descriptions of others"). This is a way of facilitating finding trustworthy partners in the NOE (see the Trust-based examples of the previous section).

3 SECI-inspired business models

3.1 Introduction to SECI

Learning is largely social in nature, and typically involves a mix of tacit and explicit knowledge. This is reflected to varying degrees in Figure 2, which locates particular forms of TEL in terms of the paradigmatic model of organizational learning, the SECI model, developed by Nonaka and Takeuchi (1995).⁵

The quadrants marked *Socialization*, *Externalization*, *Combination* and *Internalization* are derived from the SECI model and commented on below.

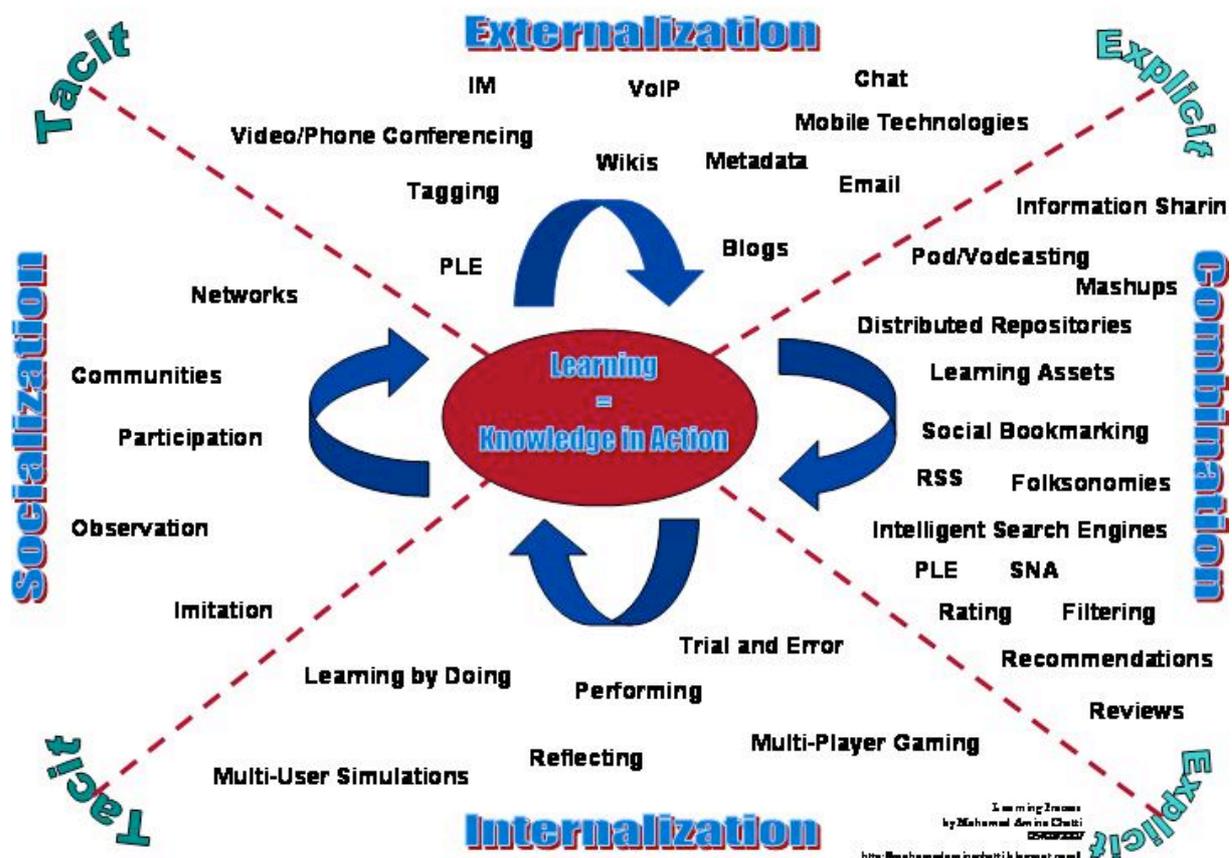


Figure 2. The Web 2.0-driven SECI model-based Learning Process (Chatti et al, 2007)

⁵ I. Nonaka and H. Takeuchi, *The Knowledge-Creating Company*, New York: Oxford University, 1995.

According to Chatti et al (2007)'s summary of SECI in a TEL context ⁶:

"Similar to the knowledge creation process, learning...is a ...spiraling, highly dynamic and complex process. It consists of four modes of knowledge conversion: socialization (tacit to tacit), externalization (tacit to explicit), combination (explicit to explicit), and internalization (explicit to tacit)...

Socialization is the process of sharing tacit knowledge, i.e. know-how, expertise, understandings, experiences and skills resulting from ...observation, imitation, practice, and participation in different formal and informal communities.

Externalization is a process of articulating tacit knowledge into explicit concepts. It is generally based on metaphors, analogies, concepts, hypotheses, and models. ...it creates new, explicit concepts from tacit knowledge..

[Some TEL implications:] Collaboration contextualizes content. For example, discussions around a blog post through comments and trackbacks give more context to the codified knowledge...

Combination is the process of systematizing concepts into a knowledge system, and it integrates different bodies of explicit knowledge. Once knowledge is captured, it becomes explicit knowledge i.e. information that can be stored and accessed.

[Some TEL implications:] Unlike traditional centralized learning object repositories, blogs and wikis build distributed community information stores with up-to-date, context-rich, and searchable learning assets. The captured information can then be transferred within a social context. ...During the combination process, reconfiguration of existing explicit knowledge through adding, reorganizing, and combining, can lead to new knowledge, possibly more complex. Other Web 2.0 technologies such as mashups can be used to pull together content from more than one source, remix and assemble it to form a new service.

Internalization is the process of embodying explicit knowledge into tacit knowledge. Explicit knowledge is internalized into individual's tacit knowledge bases in the form of mental models or technical know-how.

[Some TEL implications:] Learning by doing triggers internalization. Bringing learners competitively and cooperatively together via multi-player games and multi-user simulations offer the potential to learn through a new form of social experience. ⁷

...Internalization is also a process of continuous individual and collective reflection. Effective reflection requires the mastery of different skills such as the ability to see connections and recognize patterns and the capacity to make sense between fields, ideas, and concepts."

⁶ M. A. Chatti, R. Klamma, M. Jarke, A. Naeve, The Web 2.0-driven SECI model-based Learning Process, Proceedings of ICALT 2007

⁷ G. Siemens, *Knowing Knowledge*, Lulu.com, ISBN: 978-1-4303-0230-8, 2007

The SECI model has been used extensively across Prolearn, eg in D1.10. D5.3, D6.7, D12.1.2, etc, as shown in Figure 3.

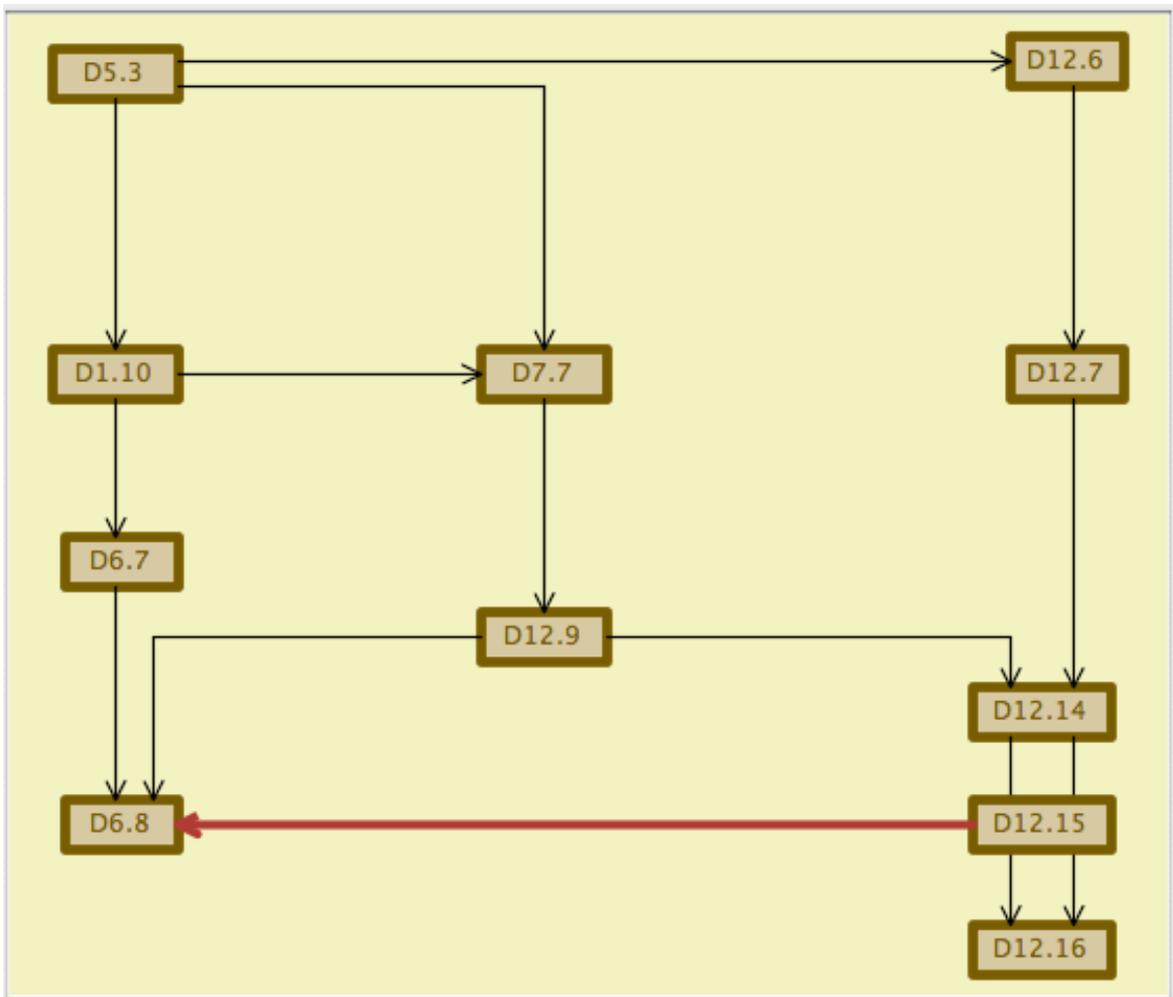


Figure 3. SECI-connected Prolearn deliverables

Here is a flavour, from page 6 of D6.7 (Flexible Architectures for TEL), which says:

"Here, the SECI-model was defined as the conceptual layer to orchestrate different TEL tools for different learning purposes (LMS for formal & Web 2.0 for informal learning) in different phases of the knowledge creating SECI-spiral. Beside the reciprocal effects and transformation processes of explicit and implicit knowledge imparted into the SECI-model as integrative parts (suitability), the selection of the model for WP 6 activities was caused by the reason that it is already used in several workpackages of PROLEARN (e.g., WP 1, 7, 12), predefines a common (methodological) understanding that fosters the interconnection, -change and the transfer of the WP 6 research results to related activities within the PROLEARN workpackage structure."

3.2 Integrative perspectives

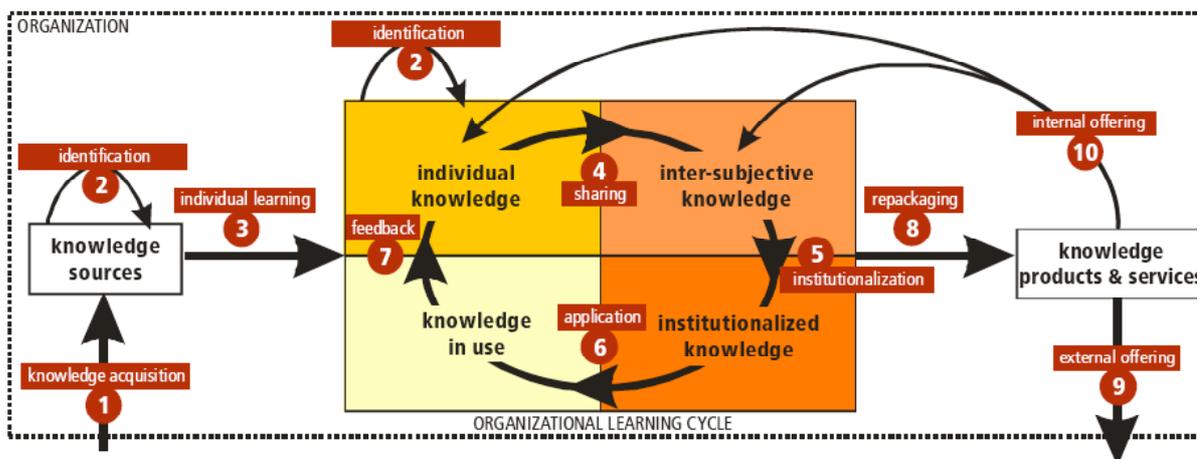


Figure 4. Model of organizational information processing (Maier, 2004; cited in Maier and Schmidt, 2007⁸)

Figure 4 and the text below are from a paper that introduces the idea of knowledge maturing (via these stages: Emergence of Ideas; Distribution in Communities; Formalization; Ad-Hoc-Training; Formal Training), and then integrates that with the SECI model as follows:

"Organizational knowledge processing starts with the establishment of data in the organization, called knowledge acquisition (1), or from within the organization, called knowledge identification (2). Via individual learning (3) knowledge sources become part of the organizational learning cycle. Individual knowledge is analyzed, verified and its value is determined by the individual. Knowledge is shared (4) and inter-subjective knowledge is created. In order to be fully accessible and independent of individuals, knowledge has to be institutionalized (5). Institutionalized knowledge (espoused theories) represents proclaimed, officially accredited or agreed ways of reacting to certain situations as opposed to knowledge (theories) in use (6) which denotes rules and hypotheses that are actually applied (institutionalized knowledge). The results of actions finally give feedback (7). New individual knowledge is created. The knowledge created, shared, institutionalized and applied within the organizational learning cycle can be refined and repackaged (8) and thus used to create knowledge products and services. These products and services can be communicated, sold and disseminated to the environment (9) or they can be communicated internally and knowledge services can be offered to employees (10)". [Section 2.2 of Maier and Schmidt, 2007]

⁸ R. Maier and A. Schmidt, 2007, Characterizing Knowledge Maturing: A Conceptual Process Model for Integrating E-Learning and Knowledge Management, In: 4th Conference Professional Knowledge Management (WM 07), Potsdam, Germany, 2007

3.3 From Drucker to business models for TEL

As Peter Drucker observed in 1954 (reported in Piller, 2002), "it is the customer who determines what a business is". Customers are becoming better informed about possible alternatives, more sensitive to cost and value, and more willing to share their insights and opinions with their peers.

In today's developed-world economies, the generic competitive strategies are still differentiation, cost leadership and focus strategies. Organizations have found it hard to succeed if they try simultaneously for both differentiation and cost leadership. But this could change, making innovations such as mass customization more feasible. Overall, business conditions are changing fast, and old business models may not work well in future.

What we see today is mainly a mix of traditional mass-market business models (business-to-consumer and business-to-business), internet equivalents (eg eBay, Amazon), and bespoke business models (through shops and the internet). The supply chains are typically owned by or driven by the largest organizations. The associated business ecosystems have a lot of scope for disintermediation (buying direct from providers, rather than through a chain of wholesalers, value-added resellers and retailers).

Prospectively, we can expect to see radical changes in business models at the level of the whole economy. Examples include:

- Mass purchasing schemes: mediated by mobile phones as identity devices, they could offer individuals and small businesses the same huge discounts as a multi-national company.
- Peer-to-peer knowledge services: people can alternate between consuming (= a student role), producing (= a tutor role) and prosuming (= a knowledgeable student who listens well but who can also do a good job as a tutor). Peer-to-peer learners can dictate what they can admit to being interested in, what they want to know about it, and who they can ask what there is to know about it.
- Customer-driven innovation: the whole community can propose features to add to a product or service, and ways to deliver those features fast and at low cost.
- Many loss-leader schemes emerge, in which products or services are free. To illustrate, lenders might require potential borrowers to take free courses on how to establish a household budget and keep to it, before they sign up for a loan.

What might be the impact of such trends on TEL and TEPL?

Consumer prices of mass-market TEL content will probably drop steeply. TEL has moved from a scarcity of digitized material, to an abundance of digitized material, much of which is free for non-commercial use (as in Open Educational Resources). As yet, there is not an abundance of high quality and well-structured material to meet common learning needs, but that may change.

At the TEPL end of the TEL market, communities of practice may become a major source of up-to-date information on responses to the interrogative pronouns (what, how, when, why, which, where, who, if...). This could make peer-to-peer viable.

Currently-favoured paradigms in TEL, which would be affected by those changes, include ways to model knowledge creation, retrieval, appropriation and modification (eg, SECI) and ways to contribute to a knowledge commons (eg, Open Research). The knowledge in a NOE like Prolearn could be invaluable in improving practice in those areas.

3.4 Significant opportunities

Here is an extract from a call for proposals for articles, which appeared in the 2007 issues of the journal *Organization Science*:

"One of the more enduring ideas in organizational science is that a firm's long-term success depends on its ability to both exploit and build upon its current capabilities while simultaneously exploring fundamentally new competencies. Unfortunately, little is known about how organizations moderate the balance between exploitation and exploration. Much of contemporary management theory has presented organizational phenomena in terms of discrete, contrasting categories, forcing firms to focus on either exploitation or exploration. Orientation on only one of these dimensions has, however, been related to poor performance and an increasing risk of longer-term failure. Successful firms balance exploitation and exploration rather than striving for one-sided maximization."

Like organizations, professionals often need to exploit their present knowledge at the same time as exploring what expertise to gain next. This is a major aim in knowledge management and continuous professional learning, as suggested in Figure 5. There could be a large market for TEL-based solutions to this generic need. SECI would be very relevant, since the challenges to be solved require each of SECI's stages. Almost certainly, new business processes would be required (see eg D6.7), and in principle communities of practice or NOEs could invite their members to come up with innovative ideas for processes, which could then be registered, with the goal of ensuring they remain free to learners, the public sector and small businesses. This leaves open the possibility of charging large companies for their use.

Organization Science identified other important yet under-researched areas:

- how organizations learn under conditions of organizational impermanence (eg project firms, which are set up to hit a single target and are closed as soon as their single target is achieved); many knowledge workers will find themselves working for such firms – what form does SECI-based learning take in such cases, and what business plans would be interesting?
- how people and organizations learn (or fail to learn) from experiences that are both significant for them, and rare

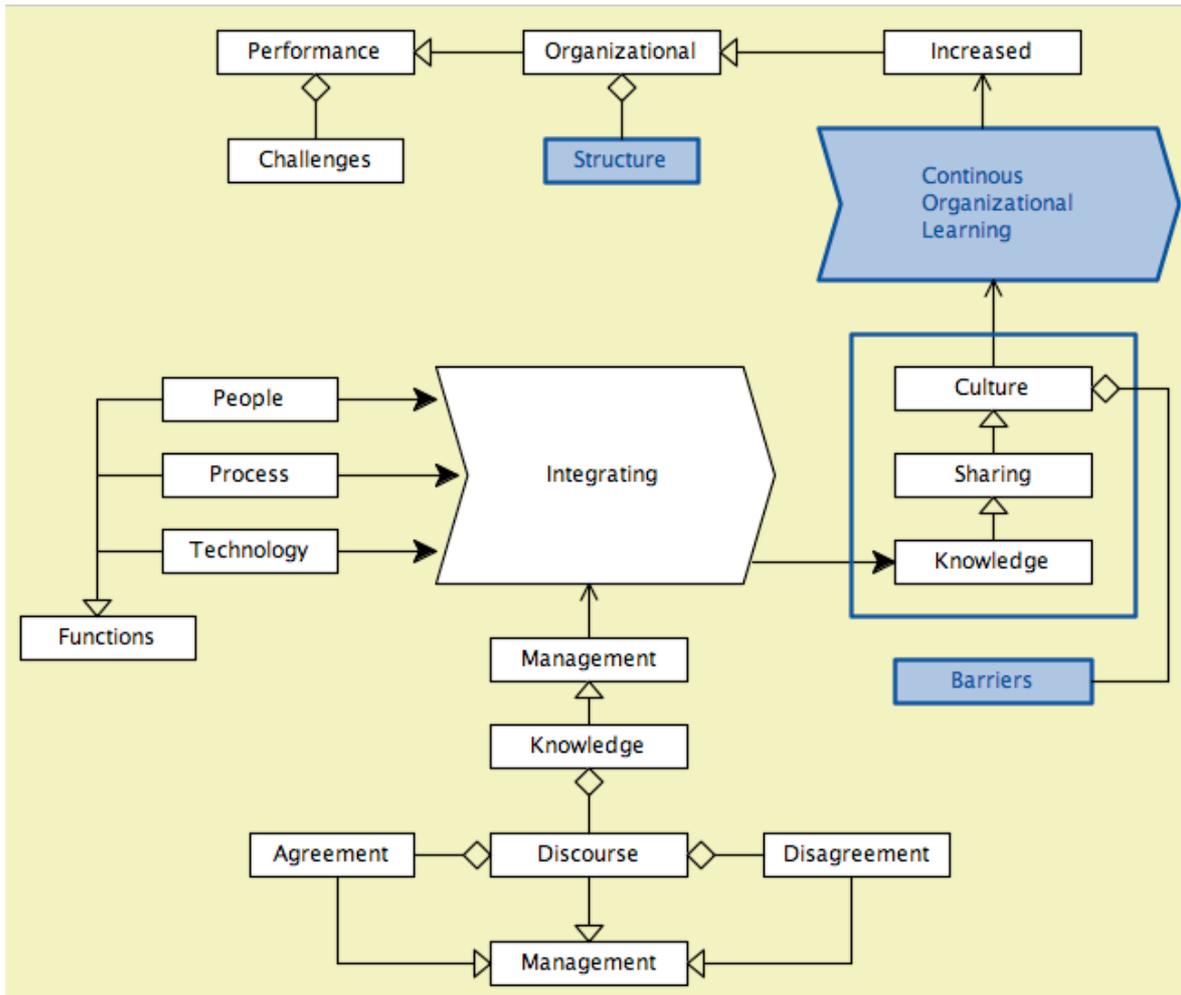


Figure 5. Overcoming barriers to continuous professional learning (source: Ambjorn Naeve)

Summary and Societal Context

The work done in this deliverable has identified an area that we shall be exploring in depth in coming months, partly with academic publications in mind but mainly because this approach to Sustainability and NOE business plans has societal implications.

One of our goals in Prolearn is using the NOE, and insights gained through it (eg as to social software, D15.5), to promote RTD that contributes significantly to the achievement of the Lisbon Agenda. RTD-led TEL of professional knowledge and skills (through formal and informal routes, including peer-to-peer learning in professional communities) is an effective way for Europe's universities to work with industry to generate world-class advances in knowledge which:

- yield high 'rents' (as an economist would put it), over a long period
 - o for example, world-leading intellectual property, IP, generated in a project [whether protected by law (as in patents) or kept private (as in trade secrets) or published (as in open research)] can be deployed in ways that encourage substantial long-term private-sector support of RTD in Europe, if the IP is managed through *Business Models* that:
 - Are well-matched to market demands and conditions
 - Offer high rates of return on knowledge capital (eg as in securitization) and other forms of capital
 - Are affordable to establish and maintain for member states and EU-based businesses
 - Are hard for other regions to emulate or challenge
- can be refreshed (brought up to date) and enhanced to stay world-class
 - o For example, participation in networks such as Prolearn (likely to become a SIG within EATEL) can lead to inter-organization discussions that identify researchable issues for collaborative RTD with the following characteristics:
 - The RTD is feasible within available resources
 - It advances knowledge in ways that are important to academia and industry (hence increases each participant's commitment, passion and drive for results)
 - It encourages cross-border collaboration to raise the rents that consultants and companies can charge for professional knowledge and to extend the period over which rents can be charged
 - It has sufficient prospective value for Industry to sponsor much or all of it, reducing or eliminating the need for public subsidy (one form of *Sustainability*)

Two terms in those bullet points, *Business Models and Sustainability*, are key in the title of this document (SECI-inspired Business Models and Prolearn Sustainability): Within Prolearn, partners from academia and industry have come closer each year to a shared understanding of both terms.

In this deliverable we explored some ideas for business models and sustainability that built upon cross-Prolearn work, extended here to refer to other literatures and to other domains and marketplaces involving professional knowledge.

We also built on the informal experience of more and more members of Prolearn:

- TEL-relevant change is becoming more apparent in the wider world, and it is clear that blogs and online discussions are becoming influential sources of information for students aiming to increase their employability by keeping up with significant changes in the knowledge base in a professional area.
- The more active and sustained the participation in multiple professional networks, the greater the degree of boundary-crossing and generation of novel ideas, and the higher the chance that industry-academia partnerships will become strategic rather than opportunistic)
- Participants in a network of excellence, NOE, will encounter a wide range of potential sources of funding for RTD; the public availability of the knowledge created will vary according to the business model in use
- Sharing experiences of NOE interactions facilitates higher-order learning about how to create and manage professional knowledge collaboratively
- Partners gain skills in reflecting on how to engage in collaborative RTD; prospectively, this can enhance the academically-grounded knowledge base in areas where this has economic value to industry partners, perhaps increasing the relevance and potential value of RTD results to end-users.

References

- M. A. Chatti et al (2007), The Web 2.0-driven SECI model-based Learning Process, Proceedings of ICALT 2007
- P. F. Drucker (1954), The practice of management, Harper: New York
- S. Ferriani, R. Corrado and C. Boshetti (2005), Organizational Learning under Organizational Impermanence: Collaborative Ties in Film Project Firms, Journal of Management and Governance (2005) 9:257–285
- V. Kamtsiou et al (2005), SECI model-based Roadmapping Process, The PROLEARN Roadmapping Process, Deliverable 12.1.2 of the PROLEARN EU/FP6 Network of Excellence, IST 507310, June 2005.
- R. Maier and A. Schmdit, (2007), Characterizing Knowledge Maturing: A Conceptual Process Model for Integrating E-Learning and Knowledge Management, In: 4th Conference Professional Knowledge Management (WM 07), Potsdam, Germany, 2007
- R. Maier (2004). Knowledge Management Systems. Information and Communication Technologies. 2. ed., Berlin.
- I. Nonaka and H. Takeuchi (1995), *The Knowledge-Creating Company*, New York: Oxford University.
- A. Naeve et al (2005), A Conceptual Modelling Approach to Studying the Learning Process with a Special Focus on Knowledge Creation. Deliverable 5.3 of the Prolearn EU/FP6 Network of Excellence, IST 507310, June 2005
- A. Naeve et al (2007), Difference between formal and informal learning processes, A SECI-based Framework for Learning Processes @ Work. Deliverable 1.10 of the Prolearn EU/FP6 Network of Excellence, IST 507310, June 2007
- F. Piller (2002), Customer interaction and digitizability – a structural approach to mass customization. In Rautenstrauch et al (ed): Moving toward mass customization. Springer: Heidelberg.
- G. Siemens (2007), *Knowing Knowledge*, Lulu.com, ISBN: 978-1-4303-0230-8.