PracSIP: Practice Scaffolding Interactive Platform

An Epistemic Game *that Organises Collaboration, Structures Activity, and Supports Subject Learning*

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Abstract. The Danish News Paper *Ekstra Bladet* has introduced an Internet platform called *Redaktionen* (*The Editorial Office*) to support students' production of News Papers. The platform is an example of a PracSIP (Practice Scaffolding Interactive Platform). A PracSIP is a special kind of epistemic game [1], which is an "immersive, technology-enhanced, role-playing [game] where players learn to become – and thus to think like – […] members of important practices and professions" [2]. The PracSIP builds on a number of design principles that are intended to promote learning outcome. A PracSIP is an artifact which is employed in settings which compares to or are project based learning. Project based learning has a lot of well-described advantages in relation to developing students' problem solving competencies, promoting their motivation, and improving their understanding of complex practices. But project learning is a complex practice itself, and thereby challenges teachers and students capability to cope with chaotic situations and unclear activity sequences. The learning design principles are aimed at supporting authentic situations, and at the same time at meeting the challenges of project based learning by organizing collaboration, structuring students' activity, and supporting their subject learning.

1 What is an epistemic game?

In their book *Situated learning* Jean Lave and Etienne Wenger developed the concept of Community of practice. A community of practice is a group of individuals participating in communal activity, and continuously creating their shared identity through engaging in and contributing to the practices of their communities and thereby developing a shared repertoire [3, 4].

David W. Shaffer argues that different communities develop different epistemic frames:

> […] epistemic frames: different ways of knowing, of deciding what is worth knowing, and of adding to the collective body of knowledge and understanding of community […] epistemic frames are a form of knowing *with* that comprise, for a particular community, knowing *where* to begin looking and asking questions, knowing *what* constitutes appropriate evidence to consider or information to assess, knowing *how* to go about gathering that evidence, and knowing *when* to draw a conclusion and/or move to a different issue […] such ways of knowing form a coherent core around which effective practices are organized [5].

Shaffer also argues that well established professions like doctors, engineers, journalists etc. each have a particular learning practice, or *practicum*. And by simulating such a practicum an *epistemic game* makes it possible for students to learn to *think like* doctors, engineers, journalists etc. That is, they learn to be a part of a particular community of practice. Shaffer gives a number of examples of epistemic games: *Digital Zoo*, "with which players become biomechanical engineers and design virtual creatures" [6], *Byline*, an internet-based publishing tool, which was designed to simulate elements of a journalism practicum [2] etc.

Hatfield and Shaffer [2] define an epistemic game as consisting of "an *activity structure* (the things players do) and a computer-based *epistemic game engine* (the technology players use) that together simulate the process by which adults become fluent in a particular professional practice" [2]. The definition does not imply that the epistemic game engine is the one that organizes the collaboration of the players or structures the activities. The organization of the collaboration and activities might be up to the teachers to take care of; or it might be a task for the students themselves to find out how to act in the games setting. A PracSIP is an epistemic game engine or, in my words, an *interactive platform* that is intended to *scaffold* the full *practice*, and therefore includes tools for organizing collaboration and structuring student activities.

2 What is a PracSIP?

A Practice Scaffolding Interactive Platform is a tool that makes students able to simulate (parts of) the community of practice of a professional setting, and thereby developing competencies that are important from an educational point of view. The case I present in this paper is a simulation of (parts of) the community of practice in a news paper editorial office. *Redaktionen* (*The Editorial Office*) is a PracSIP developed by the Danish news paper *Ekstra Bladet*. The PracSIP builds on a concept paper I wrote in 2006, and since then I have participated in the development as a consultant. It supports many of the activities in a journalist's practice such as collaboration, planning, research, writing and layout. The students write and layout a

news paper which is then send to a printing office and printed in 4 or 8 pages in color in 1000 copies on real newsprint.

The activity that develops around a PracSIP has a lot in common with project based learning (PBL). PBL is a constructivist pedagogic approach that attaches importance to the student's autonomous interdisciplinary and collaborative work with the subject matter. There is evidence that project based learning can be successful and promote students deep and long-lasting learning [7], and in a Danish study of high school students more than 72% of the students (n=710) stated that they learn much or very much when doing project-based learning. No other pedagogic method was appraised nearly as much by the students [8].

But project based learning is not without problems: "[…] projects offer many attractive promises, but they are often difficult to implement [7, cf. 9]. I summarize the challenges thus:

1) The challenge of chaotic social contexts (organization of collaboration)
2) The challenges of what to do next (structure of activity sequences)
3) The challenge of promoting subject learning central to curriculum standards (support of subject learning)

Barron et al. [7] proposes four principles of design that "can lead to doing with understanding rather than doing for the sake of doing" [7]. These principles are:

1. Learning-appropriate goals,
2. Scaffolds that support both student and teacher learning
3. Frequent opportunities for formative self-assesment and revision, and
4. Social organization that promote participation and result in a sense of agency (ibid.).

Some of the reasons for the challenges can be explained by taking a closer look into communities of practice. Etienne Wenger states three principles that characterize a community of practice. The members are bound together into a social entity through *mutual engagement*. Members are engaged in actions whose meaning they negotiate continuously. *Joint negotiated enterprise* is the participants' "negotiated response to their situation [which] thus belongs to them in a very profound sense, in spite of all the forces and influences that are beyond their control" [4]. The participants have a *shared repertoire of resources*: Words, ways of doing things, routines, actions, artifacts, styles etc. [4].

The last principle states that the participants have a shared repertoire of rules, steps in a process, knowledge of hierarchies etc. which are often tacit and inscribed in the practice. Participants in a community of practice know the organization of practice, that is they know the rules of *what* shall, must or can be done by *who*, at *what time*, *where* and *how* in relation to *whom*.

When newcomers are introduced in the community, they get to know the shared repertoire by interacting with more experienced participants as *legitimate peripheral*

participants [3]. But in a community of practice solely consisting of newcomers or one experienced (the teacher) and a number of newcomers, the repertoire of collaboration rules, communication strategies, process steps etc. must be introduced in another way preferably when it is needed by the individual newcomers, and in a way that makes the process run smoothly. When this fails, the social context is in danger of being chaotic and the newcomers (the students) have problems finding out what to do next.

For that reason the repertoire has to be more explicit, *reified*, when all participants are newcomers, but it still has to be presented in a way that does not overwhelm the students making it difficult for them to figure out when to employ what parts of the repertoire. Students therefore in more complex cases have to be supported as well in their collaboration as in their individual activity. An PracSIP therefore is an interactive platform that scaffolds both the students' organization of collaboration and helps structuring their activity.

Parts of the repertoire (like artifacts, vocabulary, styles) require the students to be capable of doing, knowing, and handling. And some of these activities are central to the school curriculum. A PracSIP therefore also integrates support of the students' development of subject related competencies.

Shaffer argues that:

> Developing those epistemic frames provides students with an opportunity to see the world in a variety of ways that are fundamentally grounded in meaningful activity and well aligned with the core skills, habits, and understandings of a postindustrial society [1].

This argument is convincing, but some parts of an epistemic frame might be more relevant in an educational context than others. And some epistemic frames might make it possible to develop more generally relevant competencies. A journalism PracSIP for instance can support students in developing their competence of writing which can be used in many other contexts. The design objectives therefore always have to be double. The developers of a PracSIP must analyze the structure of a reproductive practice [1], that is the epistemic frame, of a profession, but they must also consider which parts of the profession that demands the most important competencies, and finally they must consider how to support the pedagogical practice to minimize chaos, and support student activity. These triple objectives are equally important, but not necessarily in line with what a professional himself would consider important when developing a PracSIP.

When I was writing the concept paper describing the underlying principles and the design of *The Editorial Office* I included a description of a function that was intended to support and organize commenting on the first draft of the article (cf. 2.2.49). The reason for this function was double. First it was a way of assuring better and more thoroughly revised texts in the final paper. And secondly it was a way of focusing on writing to improve the students writing competence and their reflections on their own and others' writing. In the phase of transforming the descriptions in the

concept paper to a more thorough description that could form basis for contractual agreement and system development, the system developers and the people from *Ekstra Bladet* decided to cut away the commentary function. This decision is fully understandable if one considers that the intention of the platform is to simulate a journalism community of practice. But an epistemic game according to Shaffer must imitate dimensions of the *learning practice* of a community of practice, and an important part of the training of journalists of course is commenting and revision. And even if this had not been the case, the central role of writing in the simulated practice necessitates focus on students' writing competencies and make possible that they practice and reflect on writing in a context where they recognize the importance of producing a well-structured and well-formulated text that lives up to the genre and stylistic demands of a news paper article. The commentary function was reintroduced later in the development process.

To sum up the core design principles of a PracSIP:

- A PracSIP facilitates simulation of dimensions of an authentic community of practice,
- Scaffolds the practice by
    - Organizing collaboration
    - Structuring activities, and
- Support development of competencies that transfers to other situations

2.1 Authentic practice

Shaffer and Resnick [10] has conducted a meta-analysis of literature on authenticity in education. They found out that the term was used in a number of different ways that each described an important aspect of authenticity, but all left out important aspects. Shaffer and Resnick therefore introduced the integrating term *thick authenticity*:

> […] "thick authenticity" refers to activities that are personally meaningful, connected to important and interesting aspects of the world beyond the classroom, grounded in a systematic approach to thinking about problems and issues, and which provide for evaluation that is meaningfully related to the topics and methods being studied [10].

I use the term authentic in this sense. But I will add a fifth principle of authenticity: the importance of social relations. On the one hand there are internal social relations. Participants in an authentic practice does not do the same work at the same time, but work together by performing different parts of the task, and by being dependent on the work carried out by each other. On the other hand there are external social relations. Engaging in authentic work means to produce something that someone else is supposed to use, consume or comment on. That is to say, an important part of authenticity is that it involves social relations between the students and someone outside the class room, e.g. parents, politicians, peers etc. *Authenticity is authentic communication situations*. The professional appearance and the 1000 copies it is

going to be printed in to reach a large public, make a big difference to the students when working in *The Editorial Office*. When combined with the opportunity to take important questions from the world beyond the classroom under scrutiny in a systematic way *The Editorial Office* is thickly authentic.

2.2 Scaffolding

The term scaffolding was introduced by Wood, Bruner & Ross in 1976.

> This scaffolding consists essentially of the adult "controlling" those elements of the task that are initially beyond the learner's capacity, thus permitting him to concentrate upon and complete only those elements that are within his range of competence. The task thus proceeds to a successful conclusion [11].

In this initial conception the concept was used to describe cooperation on well-defined simple tasks where a parent or a teacher helps a student. The term has been used in a wide area of other contexts, and I will continue the extension of the use by talking about scaffolding of collaboration, and scaffolding of individual and collective activity sequence. *The PracSIP thus scaffolds practice*. I won't go deeper into the discussion of whether this extension of the term takes it beyond its limits, I will restrict myself to argue below that it meets the demands of the three components of the scaffolding framework that Roy Pea points out [12]: 1) *Fading*: It must become possible for the learner to do without the scaffold through the use of the scaffold. 2) *Channeling* and *focusing*: The scaffold can consist of reduction of the degrees of freedom for the learner to direct him on the task. And 3) *modeling*: The scaffold can be carried out by modeling more advanced solutions to the task.

2.2.1 Organizing collaboration

In a community of practice mutual engagement among other things find expression through hierarchies, collaboration, and agreements on how to get the job done, how to divide the responsibility etc.

In a simulated community of practice that consists of newcomers, these organizational challenges might be too overwhelming (cf. [9]). A PracSIP includes tools to organize the collaboration, e.g. by organizing distribution of roles and responsibilities or by organizing time, deadlines, communication channels etc.

In *The Editorial Office* it is done by supporting the distribution of students on different editorial offices, and by a time planning and task distribution tool (producing a simple Gantt chart). The planner helps the students decide on which articles to write, who has the responsibility of each subtask (researching, taking photos, writing, layout etc.), and when each subtask has its deadline. The students are supposed to continuously to indicate on the status bar which article and subtask they are working on or have finished.

Thereby the students have the possibility of being aware what their current assignment is, and when they are supposed to be finished. And their teacher has access to an overview of the students' progress.

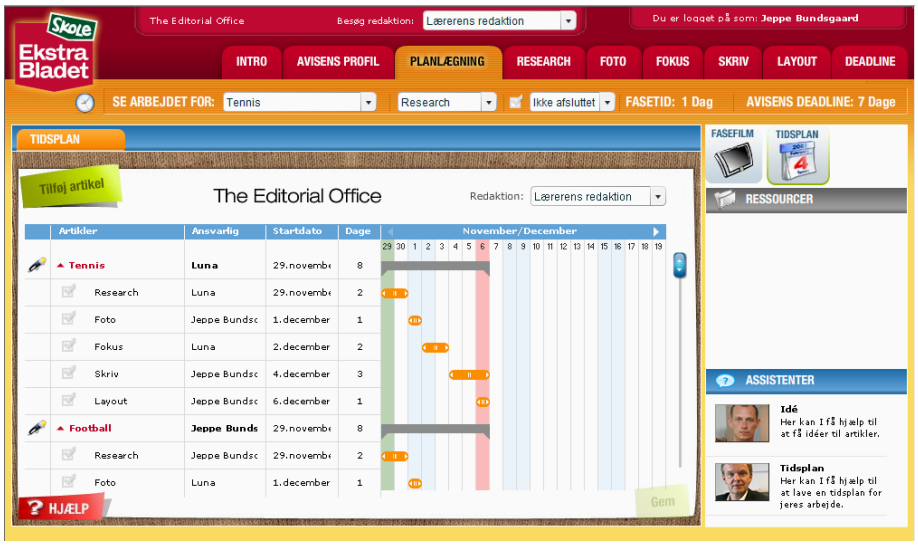

Figure 1. Planner.

2.2.2 Structuring activity sequences

The *shared repertoire of resources* is a cornerstone of the community of practice. An important resource is knowledge of sequences in which activities are supposed to be carried out or dependencies in between activities. E.g. you don't lay out an article before it is finished and revised.

In *The Editorial Office* a number of activity sequences are *channeled*. The overall sequence of planning, researching, focusing, writing, and layout is reproduced in the order of the menu points (cf. the green ellipse in Figure 2).

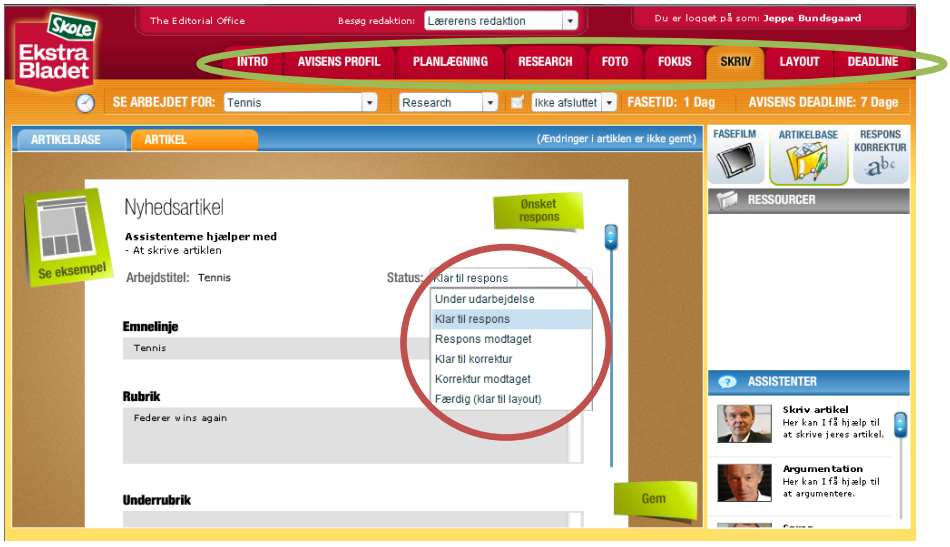

Figure 2. Activity sequences.

The process of writing and revising an article is also structured by the PracSIP (cf. the red ellipse in Figure 2). When the student thinks his article is finished, he saves it and is then asked to change the status of the article by choosing from a list of possible values, the first after 'being prepared' being 'ready for comments' and the last one being 'ready for layout'. The article does not occur in the layout tool before it has been assigned the status 'ready for layout'. The PracSIP thereby impose a certain sequence of activities, but to avoid making the system to in-flexible, it is possible to skip some of the steps in the sequence. This can be seen as a way of *fading* the PracSIP out when the students has learned to organize their sequence of activities themselves.

2.2.3 Subject learning

Simulating a community of practice is a way to improve motivation and to support students' development of multiple epistemological frames. But this might be viewed as secondary to the development of transferable more or less basic skills and knowledge. Often the resources developed in a community of practice builds on knowledge and skills that can be seen as very relevant from a curriculum point of view. A PracSIP therefore also supports the students' development of skills and knowledge that is relevant to them.

This can be done through integration of *interactive assistants*, a concept of computer assisted learning that I have introduced [9]. An interactive assistant is a computer program that guides the students through a complex problem. An interactive assistant builds on a description of an academic area, method or problem, or a core task in the community of practice; it integrates the student's project, sets the scene for the student (and not the computer) to do the thinking, and collects the input of the student in an overview that the student may print and discuss with the teacher and other students.

In *The Editorial Office* there are more than 40 such interactive assistants. The interactive assistant that helps prepare an interview starts out by asking the student who he plans to interview and to write a brain storm on what he wants to find out; then it goes on displaying the students' brain storm, and asks the student to write all the questions he can think of. On the next page the computer presents a short explanation of the difference between open and closed questions, presents him to his questions from the previous page, and asks him to write up three open questions and three closed questions. On the next page the student is asked what he imagines the interviewee would answer to the open questions, and he is asked which follow-up questions he could then ask. On the last page the interactive assistant shows the relevant input thereby offering an interview guide to the student, which he can discuss with his teacher and use when he conducts the interview.

Figure 3. Interactive assistant helping preparing an interview.

2.2.4 Organizing collaboration, structuring activities and supporting subject learning

In *The Editorial Office* there are also functions that are organizing collaboration, structuring activities and supporting subject learning all at the same time. E.g. the students are helped organizing, commenting and proofreading each others' articles. When a student thinks he has finished his article he change the status of the article to 'ready for comments', then he is asked to use an interactive assistant that helps him indicate what kind of comments he thinks he needs; now the article appears in the list of articles ready for comments. The students' teacher and classmates are now able to comment on the article by using an interactive assistant made for the purpose. Giving and receiving comments are very central to the development of writing competence. When the student has revised his article he marks it ready for proofreading, and when some of his classmates or his teacher has proofread it, he finally can mark it ready for layout.

2.3 Conclusion

A Practice Scaffolding Interactive Platform (a *PracSIP*) is an artifact, a tool informed by practice, a transformation of resources from tacit structures to explicit structures. It is not a simulator as is a flight simulator, because it does not graphically simulate a world or a person's point of view. It is a tool used by people in *their* simulation of a practice. The PracSIP organizes and structures the participants practice and thereby scaffolds their learning.

The Editorial Office has been online a good month by now, and informal response from both teachers and students has been positive and enthusiastic. But when an idea meets practice – like the idea of a PracSIP meets reality in the classrooms – unexpected things happen. My upcoming research in *The Editorial Office* hopefully will show if the unexpected was for the better or for the worse.

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