The Active Situated Learning Challenge
A pathway to new innovation fields and business opportunities?

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Abstract
This paper's point of departure is a rough differentiation between what we term "active situated learning" (ASL), and the complementary approach of "instructional learning". We give a more precise, though implicit, definition of this concept by a current prototype web implementation for history learning ("History App"). This free app, consisting of an interrelated set of content independent learning tools, was tested in 2014 by two classes within regular school lessons, and can be used for free. Features and functions of this app serve as model for its generalization outside the present frame. It is argued that ASL would offer a potential for further innovative concepts, interesting fields of research, fostering a new type of eLearning tools and applications. This potential would cover the whole range of lifelong learning. Examples of possible business application are provided in order to illustrate the extension of the approach by enterprise oriented and workplace learning scenarios. A method, based on principles of participatory design, is proposed for generating ASL tool concepts. Their relation to the existing instructional eLearning tools and platforms is shown. Options and suggestions for future developments, strategies and business models using ASL frameworks are also given.

Keywords: active learning, situated learning, authentic learning, mobile learning, lifelong learning, CSCL, tool design, learning App, BYOD, OER, Open Source

1. Introduction

Learning can take place in a formal, non-formal as well as informal way within an institutional framework (school, academy, course) or outside of it, in any real life situation.
Instructional learning is defined both as formal and institutional learning. As a complementary concept we developed a web application based on the idea of "Active situated learning"[1] ("ASL").

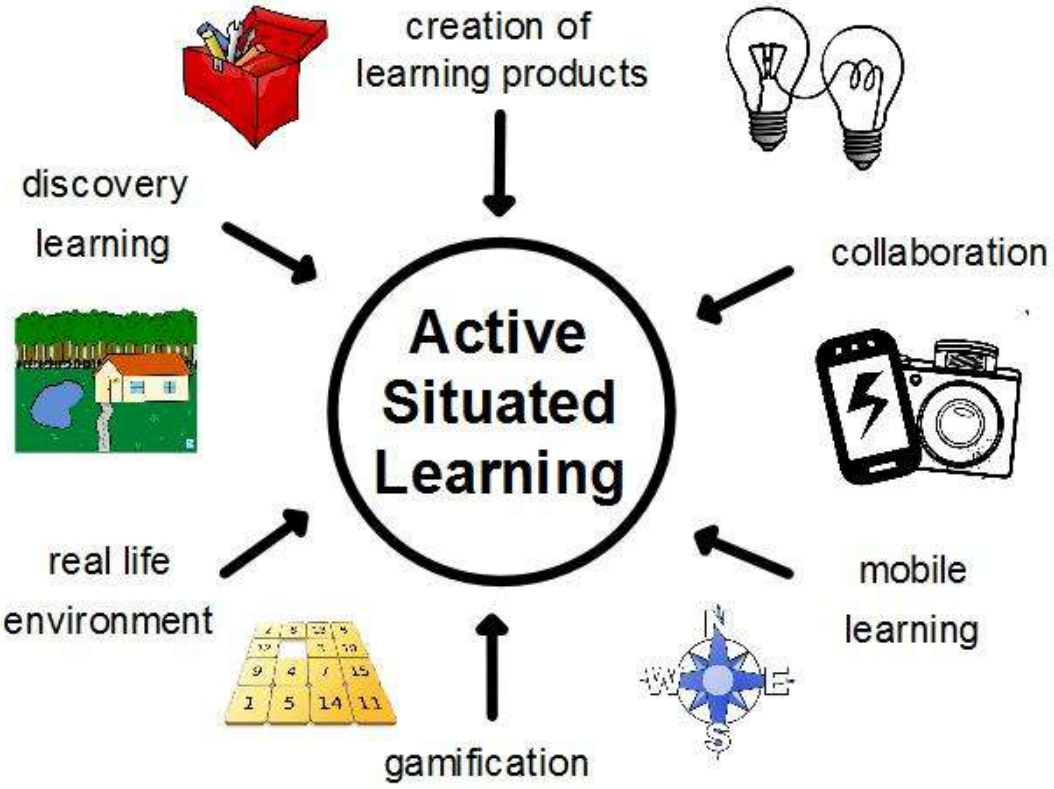
The authors of this article see learning as a process of interaction[2] and construction in a situated context (cf. Driscoll 1994; Duffy & Cunningham 1996). As Brown, Collins and Duguid (1989) argued, meaningful learning will only take place if it is embedded in the social and physical context within which it will be used. Formal learning is often quite distinct from authentic activity, or 'the ordinary practices of the culture'. Many of the activities undertaken by students are unrelated to the kind performed by practitioners in their everyday work. To achieve authenticity, they proposed the model of cognitive apprenticeships, a method designed to 'enculturate students into authentic practices through activity and social interaction'". (Herrington & Oliver 1995)

The main features of the ASL concept as used in this paper are

- the support of discovery learning;
- collaboration and cooperation of learners;
- (co-) creation and production of materials as part or result of the learning process;
- a close connection of the learning tasks to the learner's real life environment (working and discovering, "in situ" interacting with other people, …)[3];
- mobile learning understood as computer supported learning, especially with portable devices which make learning tools and materials accessible at any time from virtually anywhere;

[1] The term "active situated learning" is used here as a rough working concept, combining the main ideas of "active" and "situated" learning in a new, original approach.
[2] We use "interaction" here, if not otherwise stated, as a social term "people acting with each other", to be distinguished from "human computer interaction"
[3] See also the distinction made by Maier et al. (2010).

- gamification with competitive elements as motivating principles included in the design of the learning tools.[4]



There are many books and papers on eLearning elaborating, refining, and discussing different learning concepts and methods. However, only few attempts to lay down a general methodological concept for a tool design are known, among these Herrington & Sparrow, 2000. Compared with these approaches, the ASL approach is more “radical” in the following respect: Learning tools based on given principles of ASL are free of content, hence adaptable to any topic. Content in different forms of learning materials can be imported, but is not an integral part of any application. This core feature ensures a wide range of applicability. One may object that this is very similar to Learning management systems (LMS) like for instance moodle, and ask, what is new about ASL?

LMS integrate regular communication (forum, chat room, e-mail etc.), testing (e.g. multiple choice) and data exchange tools (file folders, photo gallery, embedding functions and others) in a closed learning environment to be used in school or at home, and simply by this, they are not made to support situated learning.

2. The Mobile History Learning App

In 2013 the authors of this paper started to elaborate the concept for a “Mobile History Learning App” for use in secondary school education according to the above mentioned ASL approach. The Open Source webapp was developed and financed in partnership with the Carl Benz Academy Beijing, the

[4] To include game elements into learning is mostly welcomed by learners. It would be misleading to restrict “gamification” to a young age class. What eLearning practitioners usually confirm, is the stimulating role of adequately designed and embedded competitive elements (as a very elementary instance of gaming) within learning processes. Scoring as sketched in the examples given above (ch. 3.2) seems to be a simple and effective means. Such a mechanism has a low risk to distract participants from their main activity or to introduce undesired extrinsic motivators; it could be standardized and eventually be implemented in such a way that it is easily adaptable by the user to any of the given tools for all applications. See also Kapp 2012.

German Federal Agency for Civic Education, the state archives of Rhineland-Palatinate as well as the local archives of Koblenz and Linz on the Rhine.[5] By January 2014 it was implemented and published as OER:

http://app-in-die-geschichte.de/

The piloting within regular history lessons took place at Eichendorff-Gymnasium in Koblenz, Germany between February and June 2014 in one lower secondary and one upper secondary class. At the end of the classroom period an online survey was done showing overall very positive reactions by the students. A large majority was in favour of using the app more often in the history classroom. In their answers students were pointing out that learning history with the app offered them a new approach which was more fun and more interesting than the regular lessons they were used to. Some problems concerning the usability of the app met criticism and at the same time students gave a very constructive feedback how to improve the app from a user's point of view.

2.1 The ASL Concept in history learning

The context of our learning scenarios respectively didactic settings is situated in formal learning environments of history lessons in lower and upper secondary schools. However, within this framework of school learning one has to consider informal learning happening in everyday life, in spare time and in school as well. Informal learning is understood as non-intentional and implicit learning which is not structured and without certification (Livingstone, 2006; Marsick & Volpe, 1999). This is especially true with the opening of the setting and the use of mobile devices by the learners giving a growing importance to informal learning processes within formal education. Using mobile devices in history learning gives students the opportunity to think, research, document, share and discuss their ideas and results transcending the borders of their classroom and school, as well as, with their peer and learning group. Leaving the classroom, learning outside of the school building and social interaction become an important part of the learning process. Traditionally, history lessons in schools are based mainly on the use of a textbook, a black- or whiteboard and paper copies made by the teacher. Whereas, if students leave schools they will find history all around them in their school and in their home town: street names, plaques, monuments, memorials, buildings, festivals etc. (cf. König & Bernsen, 2013 & 2014).
Our idea was to find methods sustained by digital tools to let students discover, document and analyse the history in their living environment. By using mobile devices, history can be perceived in its grown correlation of time and space. Furthermore, the methods and tools should be fun to work and play to motivate students to go discovering history also in their leisure time.
Active history learning methods are derived and “downgraded” for school learning from scientific research methods as used by professional historians. They are supposed to foster historical thinking (cf. http://historicalthinking.ca). That is to establish historical significance, use primary source evidence, identify continuity and change, analyze cause and consequence, take historical perspectives, and understand the ethical dimension of historical interpretations. This enables students to deconstruct existing narrations and to tell history themselves using different media.
Additionally the traditional working methods of historians are broadened by new aspects in the digital age. Nowadays historians see themselves confronted with

- new types primary and secondary sources,
- new ways of digital based research and data driven analysis,
- new tools for communication and publication.

By using digital tools inside and outside the classroom, history learning in schools is also adapted to the change of history as a science in the digital age (cf. Bernsen, König,& Spahn, 2012; Nawrotzki & Dougherty, 2013; Mills Kelly, 2013).

2.2 Structure and tools of the HistoryApp

The app is open for free and public use (Open Source and OER), however learning takes place in closed user group mode. Its structure consists of user and content management system (CMS, registration), and the working area (open set of learning tools). Teachers can create learning groups, and register their students. Direct access is provided to digitized primary sources from local and regional archives as well as to the contents of Wikimedia Commons und Flickr Commons. Own contents (text, photos) can also be uploaded; additionally, videos can be embedded from other Internet sites like YouTube.

[5] For further information please see: http://app-in-die-geschichte.de/about

Currently, three learning tools, all connected to the content base, are implemented:

- Tagging Game: Geotagging of primary sources with GPS and photo function of mobile devices (given historical pictures; goal: matching historical with today's perspective)
- Mapping Game: Key wording of primary sources by students
- Timeline editor: constructing multimedia timelines with text, photos and movies

The games allow competition. Points are given for activities and correct solutions. The best users are placed with their results in a general scoring list of all groups and users of the History App.

Further functions are planned such as

- Augmented Reality functions overlaying historical paintings and photos with the smartphone's current perspective, comparing the historical picture with real world today.
- Historical maps and today's digital maps (OpenStreetMap, GoogleMaps) are used with the possibility to create multimedia interactive city tours and rallies using all available maps
- Making movies & interactive slide shows from primary sources and personal materials

The app's Open Source concept aims to facilitate any further development (e.g. changing existing tools or adding new ones) or to adapt and use it in different application scenarios. A most obvious step would be to provide a multi language version; this could easily be achieved by just translating the relatively few texts. The present architecture of the History App would then allow cross-border cooperative learning: students and other users from different countries work on the same topic and compare the history of their towns and regions.

Parallel to our HistoryApp development and implementation process we addressed the question of generalization the current ASL history learning tool concept for other school disciplines, Whereas the existing, above mentioned app tools like "mapping game", "tagging game" (ch. 2.2), would well be usable among other schools subjects especially for arts, literature, biology, geography, and social studies, outside of these disciplines, especially for learning within a real business situation, further learning tools would have to be added, and the competitive gaming elements would require modifications, for instance age specific graphics and user interface.

The next chapter will describe how the history App concept and implementation serve both as a model and a point of departure for widening the range of applications, as well as stimulating new learning tool ideas.

3. Designing ASL Tools for Business Applications

Whereas within a school learning situation the "mobile learning" ALS feature (ch 1) requires to leave the standard learning location, the classroom, in order to enter the "real world", there is no such separation for business people. There are no institutional barriers between the working and the learning environment. The examples given in paragraph 3.2 will illustrate how the use of web based tools and mobile devices allow for an even closer connection and mutually enriching interplay between working and learning[6]. The technology will allow even to go further steps beyond existing barriers, like sharing experiences, learning situations with customers simultaneously at remote places.

3.1 How to generate promising tool ideas for business applications

Designing new tools and applications could start with a rough concept, which may have been derived from certain theories in a deductive manner, however accompanied by a careful empirical analysis of what the people were doing within their respective working processes, and later on to be transferred into this "real business situation". Especially in the early stages of IT development there have been countless examples where this method failed. One of the most thorough and influential analyses of the pitfalls of traditional application design was presented by Winograd and Flores 1985. By the seemingly trivial question "what is this person doing now?" (in a current business situation) they demonstrate by the great variety of possible answers (e.g. "writing English text", …"working on preparations for the

[6] According to the concept of distributed intelligence (Müller 1994).

new contract" …) how dangerous it is to base an application design on any "action-supporting-tool" metaphor. (Winograd and Flores, 1986, p 143). Any perception and definition of an action is always biased by the observer's background and perspective. Their requirements for new, improved design directions (ibid. pp 143ff.) seem not only still relevant today for any kind of tool, but even more so for learning tools, especially of the ALS type. Apparently, the question "what is this person learning?" in the same business situation would also have no unique answer.[7]

These insights combined with practical experience within industrial research and development of interactive learning tools suggest to use the participative design method (Spinuzzi, 2005; Sarodnick & Brau, 2010) instead of an analytical deductive approach. The example list of paragraph 3.2 was an outcome of the following participative design process:

- formation of a group of experts (experienced and active business people, as user prospects)
- short briefing about ASL (10 minutes, instructional phase)
- use interactively the HistoryApp[8], think back to your own school experience (inspiration phase)
- produce tool and application ideas related to your own working situation (creativity phase)
- discuss, modify, refine, and discard ideas (evaluation phase)

3.2 ASL Application scenarios and Application Ideas in a business environment

The standard setting of all scenarios is a learning group. The group formation can happen intentionally, self organized, randomly, or in a formal setting, e.g. an event organized by a company's HR department. By default, all group results are private; any publishing outside (also within the company) has to be agreed by the participants.

3.2.1 Idea 1: "Participant Observation for sales people"
As shown in chapter 2 in the case of the mobile history App, ASL tool concepts can be derived from scientific working methods[9]. Any scientific research, especially empirical kinds, can be regarded as a special case of ASL, hence a potential source for designing new learning concepts. We take a common empirical scientific research method of "Participant Observation" as an example for deriving a business "workplace" ASL concept.
In Wikipedia the "Participant Observation" (PO) method is described as follows
"Participant observation is one type of data collection method typically done in the qualitative research paradigm. It is a widely used methodology in many disciplines, particularly cultural anthropology and (European) ethnology, less so in sociology, communication studies, human geography and social psychology. Its aim is to gain a close and intimate familiarity with a given group of individuals (such as a religious, occupational, sub cultural group, or a particular community) and their practices through an intensive involvement with people in their cultural environment, usually over an extended period of time."[10]

To make the idea clearer, let's take for instance a car sales person. Customer communication is the every day's core activity. The setting is very similar to the PO method, except that the setting is persistent as long as the person does this job. Such a person has had intense trainings, both real life and computer based, and will from time to time participate in refining courses, exchanging ideas with colleagues. His experience will grow with age, and he will possibly have reached the satisfying stage of a most successful sales person. Rapidly changing market conditions and growing competition will always be a motivation, not only for permanent learning efforts, but also for new and promising ways to explore.

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[7] A similar and very common source for design failures is to perceive and describe situations in terms of "problems" and "problem solving" (ibid. p 77); the implications for an alleged "problem solving ability" as a learning goal are interesting, but can not be deepened here.
[8] Other tools according the ASL features would also be appropriate in this design stage. But an important requirement for the creativity process has to be fulfilled: the application area of the "inspiring tool" has to be remote from the group's current business situation in order to avoid disturbing associations.
[9] For a further inspiring source see the list of methods in the context of participatory design by Sarodnick & Brau (2010), also quoted in http://www.uselab.tu-berlin.de/wiki/index.php/Partizipatives_Design
[10] http://en.wikipedia.org/wiki/Participant_observation, retrieved February 20, 2015.

PO based game: A group of sales persons start the competitive game. The game is based on a general method to identify the matching between different customer - salesperson communication styles.
Step 1: Registration
Step 2: Each person starts an individual online self assessment:
Result: type identification, graphical presentation, report, get scores…
Step 3: Analyze results individually, identify causes and implications for own communication;
Compare with competitors results; discuss with colleagues, ..
Step 4: Observing and reflecting own behaviour in the following phase of real life communication;
Identify possible factors for improvement
Step 5: Return to step 2, repeat until end of game

This game could be refined and expanded by using further functions of mobile devices (like connections to wearable sensors, video recording)

3.2.2 Idea 2: "Producing a Company Guide for Newcomers"
Newcomers, trainees are learners by definition. They have a different background than the established colleagues, hence a different perspective towards organizational roles, structures, processes, behaviour or communication. This opportunity for new impulses, ideas, even for innovation should be used. The following application idea is based on the "role inversion" by putting the learner in a teacher role, and transforming one sided learning into mutual learning.

Let's assume, we have a pioneer group of company novices, i.e. there are no results from previous participants. Their task is to transform their own fresh experience into an interactive guide for the next generation of newcomers. Publishing questions, ideas referring to the current business situation (processes, routines, products, services, market, quality, chances, obstacles, …) is also requested.

What they would need at first is a web authoring tool for publishing their findings, suggestions (text, audio, photo, video, links). There is a "meeting room", to discuss own ideas, e.g. introducing categories, attributes referring the own contents.

There will also be a competitive element, referring to the participant's content contribution. The participants themselves will evaluate them. Moreover, questions, ideas, suggestions can be accessed, answered, assessed by other employees/managers. This kind of filtering will help to maintain the quality of the guide, especially in large organizations.

3.2.3 Idea 3: "Cross Cultural Market Discoveries"[11]
The following project task (referring to a global car manufacturer's product, say a certain luxury passenger car model) is given to a learning group consisting of people from different countries (say USA, China, Japan):

- Identify cultural similarities and differences related to factors like brand perception, customer attitudes, communication and life styles, consumer's milieus, employee satisfaction, process quality.
- Find or produce own material (text, audio, photos, video) which most adequately could illustrate the relevant features.
- Try to enlarge your learning group by involving customers and to create a situation of interactive mutual learning.
- Compile, annotate, discuss your findings, make final report, multimedia publication.

A competitive ("gamification") element is also given by a scoring list rewarding the quality of contributions (possible criteria: e.g. most significant cultural invariant/difference, strongest learning effect). Results can be compiled and edited for instance to prepare professionals to be sent abroad by their company.

The ASL feature of mobile learning (ch. 1) is of special importance for the above mentioned milieu discovery as well as for service related applications. If a customer (as a member of the learning group or not) has problems with the car, it would allow a live conversation, as well as, recording sounds (in car, engine).

[11] This group activity can be regarded as (simplified) ethnographic market research; more approaches of this kind, hence inspirations for further ASL methods can be found in Elliott & Jankel (2003).

4 A wide range of possible applications

The four cases described in the previous chapter are illustrative examples and suggestions for ASL tool design. They refer to the seemingly special application area of sales and marketing, but it seems evident that the design approach of paragraph 3.2 would also work for other company departments (purchase, product development, finance, human resources, …) and lead analogously to respective tool concepts. An implementation and test of tools within a company's workplace learning situation is planned. Both the practical proof of the concept for history learning (ch. 2) and the current feedback from business professionals are encouraging to pursue the ASL tool design strategy.

A fundamental structural feature of any ASL tool architecture is its content independence, as demonstrated by the History Learning App (ch 2). Contents are accessible and editable (via CMS, editors, authoring functions) by all tools, but always strictly separated from the tools. To provide topic dependent contents for the tool's database system and learning tasks is solely the user's responsibility (learner, teacher, coach). This feature implies a wide variety of business application for virtually all branches of industry (including product manufacturers, service providers, private or public organizations). Moreover there is no restriction for using tools outside of institutional settings by free, self organized learning groups.

A further advantage of this architecture is to provide multilingual versions at low expense. Just the texts for navigation, buttons, help have to be translated.

Further functions could be offered as configurable options, for instance using sensory input (from wearable devices, click tracking, real-time analysis, …) in order to adaptively control and optimize the user interface (like navigation style preference, age dependent look & feel). Environments, editors for building own simulation models e.g. for visualizing basic interdependencies.

As stated in chapter 1, ASL is conceived as complementing instructional learning. This does not generally exclude the replacement of instructional by ASL elements. But this interesting, possibly far reaching question is an issue to be addressed and decided by teachers practice, respective pedagogical research, and cannot be answered here.

In the foreseeable future we expect a coexistence of different learning approaches. Concerning the relation of ASL and instructional learning, we see them in a similar way as the common "classroom - practical training" learning phases/modes are related to each other. On the standard instructional learning tool side, following the classroom, lecture or course metaphor, there is a large variety of video platforms (Khan Academy as the most know), course management systems like Massive Open Online Courses (MOOCs) and other learning platforms (like Coursera, Udacity, Moodle). Within all branches of industry widespread and long established use is made by computer based training (CBT) tools.

Authoring functions are commonly part of such instructional learning platforms. They are the core tool to produce the final learning application for a given topic incorporating the appropriate contents to be used by the students during their learning process. Whereas here, an authoring tool is generally a teacher's tool, for ASL, authoring tools by contrast are always learner's tools. ASL is mainly about the empowerment of learners to equip them with necessary tools and to give them access to materials for independent discovery learning.

The idea to enrich instructional learning tools by elements of "situated" or project based learning is not new. Computer-supported collaborative learning (CSCL) tools for instance offer respective functions (Stahl et al, 2006). "Authentic learning" is another example in this direction (Herrington 2006). The ten characteristics of "authentic tasks" (ibid.) seem also helpful in the process of designing methods and tools according the ASL approach.

Certain functions (like group administration, learner group support, live interaction, ...) can be found in "both worlds". Of course, if a closer integration between ASL tools and instructional learning would be necessary, such doubling should and could be avoided. From a methodological perspective, ASL tools need not necessarily an Instructional Learning companion tool.

Since a group of professionals is always part of the ASL workplace setting, a connectivity to social business media (inside a company, as well as externally, like LinkedIn, XING, …) could be useful, and

easy to implement. They offer a convenient way to identify learning topics, goals, partners, self organization of groups with members from different companies.

5 Financial aspects - elements of a business model

Whereas within the public education sector development and maintenance costs of eLearning tools can hardly be covered from other sources than funding there are more options in the private sector, especially all business branches for goods and services. Based on the principles of ASL special mobile applications with specific tools can be developed for the use of training on the job or apprenticeship in one company.

Once such learning tools are developed, the company could use income from commercial clients to fund the adaptation of these tools for the free use in public schools or simply allow the content free programming of these tools as Open Source and their use as OER. Such initiative could contribute to a positive image of the company, and at the same time to the development of public education.

ASL tools have investment costs, but only small maintenance costs for contents. The work of authoring, editing, generating content is part of the student's task. OER type of learning tools usually require more or less continuous updates of content which provides also continuous learning and working tasks for new learners.

Many eLearning settings allow the involvement of a teacher, tutor or coach, both in synchronous or asynchronous modes (videoconferencing, chat, forum, …). This is also the case with ASL tools. If a learning task or situation can be related to an important organizational project, as for instance quality assessment or process optimization, coaching a learning group and consultation for a business unit could be offered and processed as an integrated package.

Adobe's eLearning platform "Adobe Connect" offers third party's extensions and add-ons[12], usually against payment, ASL tools could well fit to this business model. There are also access points to these platform functions from social business media (e.g. LinkedIn).

Further possible add-on services could include training of multipliers (tutors, coaches) for different ASL tools, customizing ASL tools to special requirements and integration into existing MOOCs, OER, supporting access and editing to required contents, evaluation studies or empirical research (e,g, impact on employee's performance and satisfaction).

First important steps were made towards the foundation and design of an ASL tool family and framework. The practical proof of concept has taken place in a real school environment. More work has to be done: concept refinement and validation; critical discussion within the scientific community, prototyping and test of tool ideas in real life business environments, evaluation and empirical research.

Horizon 2020, the big EU Research and Innovation programme, could be the opportunity to research and develop the ASL approach in a dense syndetic working process of theory, practice and development of digital tools.

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[12] See http://www.adobe.com/de/products/adobeconnect/extend.html#4

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