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Collaborative creativity with eCiC

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Abstract

Students are often attentive highly motivated individuals who have good ideas which can provide successful solutions for all parties concerned, but mostly they have no way of bringing in and developing new ideas with other students in order to improve learning and educational processes. To enable collaborative creativity, the eCollaboration-Research Team at the Swiss Distance University of Applied Sciences has developed a solution whereby students or teachers can collaborate and nurture new creative ideas in a structured and guided way. In our solution, this nurturing takes place by means of a collaborative online process in which the "idea seed" will be "cultivated" during various interactive phases as defined by the eCIC method and supported by the eCIC online tool (eCiC = electronic Collaborative idea Cultivation). Together the method and tool constitute the eCIC system. The eCiC interaction method is a procedure which defines a creative collaboration session in three stages: 1) the setting up of a creative collaboration session, 2) ideas processing according to the "Stockalper model" as well as applying the Solution Finder Model (SFM) and 3) closing the creative collaboration session. Stage 2 contains the use of two relevant models, the "Stockalper Model" which guides the user through three different questions, symbolised by the moon (illuminate your way in the darkness), stars (search for new ideas) and sun (deploy your solution) as well as the Solution Finder Model, a problem-solving method which is based on the principle that in order to find a high quality solution, the 3 elements of need, objective and solution should always be identified and explicitly connected to build a coherent triad (the unity). This paper describes the eCiC approach, the method and models, the online tool as well as some applications in educational situations. As the eCiC system has already been used in distributed research teams, worldwide business companies and distant driven educational courses, a summary of experiences, possible applications and future developments will be made.

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1. Introduction

Creative collaboration among students is an activity that plays an increasingly important role in education. Various relevant educational activities, like project-based learning, round-table discussions, game-based learning, collaborative learning and open learning, require ways of learning together in order to produce shared results which

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can greatly benefit from creative contributions. But collaboration and cooperation are not easy (Sennett 2012) and schools are not particularly renowned as creative places (Robinson 2012): so it is not surprising that problems with creative collaboration are rather common among students (Fominikh 2014) and can lead to frustration and hinder the learning process in many ways (Liu 2010). Often it is the technology used for the collaboration which is blamed for the problems of student collaboration, but this blame may be misleading (Sorensen, 2005).

We usually think about creative work in terms of the exceptional performances of a single individual, but creativity can be greatly enhanced by leveraging diversity, tension and sharing if people play well together (Klocek 2011). The question is then how to "play well" in a collaborative educational setting that requires creativity? Charles Leadbeater, author and former advisor to Tony Blair (Pfauth 2008), proposed five conditions for stimulating creativity through collaborative action:

- DIVERSITY: Diversity is king. Participants need to think differently and have different knowledge.
- SHARING: Give people ways to contribute. They need really simple ways to add their piece of information.
- CONNECTION: Connect people with each other by using the most suitable technology.
- PURPOSE & PAY-OFF: The most important one: participants must have a shared sense of purpose and an individual sense of pay-off. Use a mascot or something.
- STRUCTURE: Communities need to have some element of structure to make decisions.

Our eCiC system, an online system for collaborative idea cultivation, fulfils these conditions and has the potential to support students in "playing well" together and to stimulate creativity among them. In the first part of this paper, we present the approach and the two systems' components, a method of interaction and an online collaboration tool. In the second part, we will then suggest some opportunities for promoting creative collaboration in education by applying the eCiC system.

2. The eCiC Approach

Collaborative learning is, in essence, the co-construction of shared understanding (Roschelle and Teasley 1995; Dillenbourg & Fischer 2007). More specifically, Schwartz (1995) suggested that the effort of an individual student to understand other colleagues constitutes the real driving force of collaborative learning. The importance of this effort is reflected in the conception of the eCiC approach and in the design of the eCiC system. In a class or group, when a student is trying to understand other colleagues and also when he/she is trying to contribute to the class's or group's work, the student will have and propose ideas. And what happens in the class or group interaction with these ideas? They will enter the conversation or debate and slowly disappear in a sea of words, leaving a quickly disappearing wake pattern. This may be ok in most cases but is surely a problem when the lost idea had the potential of making an important contribution. The need in such situations consists of taking the idea seriously, keeping it alive and recognising its value. This is where our approach comes in: our objective is to make sure that the idea does not get lost and to offer it a chance of being taken seriously, kept alive and recognised for its value. The foundation of this is our conception of any idea as a seed: if we give them some special attention and nurturing, they will grow and reveal their true potential. In our solution, this special attention and nurturing is carried out by means of a collaborative online process in which the "idea seed" will be "cultivated" in various interactive phases defined by the eCIC method and supported by the eCIC online tool. Together, the method and tool constitute the eCIC system.

3. The eCiC Interaction Method

How can a student who has an idea propose it to the group or whole class for discussion and how can we make sure that this idea will not be ignored, will not disappear and that the student's potential contribution will not be lost forever? Our solution to meet these objectives consists of a facilitated interaction process which will proceed online with the common purpose or goal of cultivating the proposed idea. Our design of the whole interaction process and platform has been guided by the objective of promoting a sense of community. The main reason for choosing this design principle is that we see in the community of practice model developed by Wenger (1998, Wenger et al. 2002, Bettoni et al. 2007) the best way to fulfil the aforementioned conditions for stimulating creativity through collaborative action: diversity, sharing, connection, purpose & pay-off, structure (see section 1 - Introduction). The eCiC interaction method is a procedure that defines three stages of a creative collaboration session: a) stage 1: setting up of a creative collaboration session; b) stage 2: idea processing according to the "Stockalper model"; c) stage 3: closing the creative collaboration session.

3.1. Creative collaboration session: set up

When a student has an idea and wants to propose it to the group or whole class for discussion, he/she logs in in the eCiC platform. The student's role is here that of an "idea owner"; as such, the student can post a short

description of the idea in the "Idea entry" forum. A team of students with the role of facilitators (Facilitator Team or F-team) will see the new entry, briefly discuss it and appoint a member of their team to the role of "idea facilitator"; from now on, this student will be responsible for the further processing of the idea. At first, the idea facilitator will check that the new idea is suitable for eCiC according to some criteria (for instance: form, content, time, duration, etc.); if this is the case, he/she will then start a new discussion (in the "Team Building" forum) for setting up a team of students interested in collaborating to further develop this idea (Idea Team or I-team). Required members of the I-team are: the idea owner, the I-team facilitator, one or more ideas supporters and possibly either a "devil supporter", a devil's advocate for engaging others in an argumentative discussion process or an "angel supporter", dedicated to promoting a more conversational, dialogical way of interacting (Gurteen 2014, Zeldin 1998); all of them are recruited from students of the same class. Next the facilitator will announce in a dedicated "Idea News" forum the opportunity to participate as supporters in developing the idea and will give the link to the idea posting as well as that to the team building discussion. All students will see this announcement and, in case they want to become a member of the I-team in the role of an "idea supporter", they will register by posting a short motivation statement in the team building discussion. Once the team building has been completed, the facilitator will clarify some planning issues (like dates for synchronous meetings or session milestones) first with the idea owner and then with the whole I-team. Eventually, all is ready for starting the idea processing.

3.2. The "Stockalper model" of idea processing

Within a creative collaboration session, idea processing follows the so-called "Stockalper model"[†] in which three processing phases - a moon phase, a stars phase and a sun phase - are combined to form a unitary sequence. At the beginning of idea processing, the facilitator will open a new discussion in the "idea processing" forum and for each phase, a new discussion thread will be opened at the beginning of the phase. At the end of each phase, the facilitator will write a summary of the results in the idea processing wiki, where each idea will have its own wiki page. Before starting with phase 1, the facilitator will also create a new record in the idea database, a collection of all relevant idea processing features, like idea identification number, idea title, idea short description, name of the idea owner, processing status, date of idea entry, link to forum discussion, link to wiki page and link to results.

Phase 1: The Moon phase. During this first phase, we clarify the proposed idea and search together for its objective (idea definition). The moon symbolises the fact that we start our search in the dark and are looking for something that provides us with a grip so that we can advance more easily in the intended direction. This phase of idea identification provides answers to the question of "WHAT do we want to achieve?" It contributes to understanding the problem (need) and to defining which objective to pursue.

Phase 2: The Stars phase. In this phase, we search for solution ideas (idea search). The stars symbolise nearby and far away solution ideas which appear in many different forms and together constitute our solutions space. The phase of ideas finding provides answers to the question of "HOW can we reach the WHAT of phase 1?" Many solution ideas are collected, analysed and systematically evaluated in terms of their suitability in satisfying the identified needs and reaching the defined objective. This is a crucial moment of the conversation and in order to make sure that collaboration proceeds efficiently and effectively, we apply our SFM method here (see next section 3.4), a problem-solving method for finding high quality solutions quickly (Bettoni et al. 2013). The task of applying the SFM method is usually assigned to the facilitator but in principle any member of the I-team could do it, provided he/she has received some training and gained some experience.

Phase 3: The Sun phase. In this last phase, we work on one idea selected from phase 2 and try to determine how to implement it (idea implementation). The sun symbolises the elected star with its unique features. This phase of idea implementation provides answers to the question of "BY WHAT means can we implement the HOW from phase 2?" Practicable solution ideas are analysed in terms of their suitability for implementation and improved accordingly. At the end, a short report and a fact sheet are produced which describe the idea as it finally resulted from the three processing steps.

[†] Kaspar Jodok von Stockalper (1609-1691 in Brig, Valais) was a merchant, banker, officer, politician and entrepreneur in Valais. Pope Urban VIII awarded him the Order of the Golden Spur. Between 1658 and 1678 he built in Brig a castle known as the "Stockalper Palace", today recognized as a Swiss heritage site of national significance. Sun, star and moon are placed as pinnacles on three rooftops of the castle, thus symbolizing a connection with the universe and more generally "universality".

3.3. Creative collaboration session: closing

When the two documents for the idea report and idea fact sheet are ready, the facilitator will update the database record and then create a fourth thread in the idea processing discussion where he/she asks the team what they suggest doing next with the results of the work. This discussion will produce a simple to do list of tasks with deadlines and the persons in charge. When a task has been accomplished, the person in charge will post a short notice in the same thread. When all the tasks have been accomplished, the facilitator will invite each team member to participate in a short evaluation survey about the whole session; after that, the session will be closed by each team member saying thank you and goodbye in a creative way. An important fact in collaborative creativity is the separation of divergent and convergent thinking phases. The worst thing for a new "idea seed" is to criticise this idea by immediately analysing it and taking the idea down by evaluating a not yet cultivated idea. Phase 1 and the first part of phase 2 are divergent thinking phases whereby an evaluation of a new idea is not foreseen, especially one that could easily kill an early idea. And at the end of phase 2, there is an evaluation process driven by the solution finder model which allows a search for sustainable solutions and opportunities rather than for prevention of an idea. The user will be guided through the online tool as well as by the idea facilitator. This makes it possible for the user to start and proceed without any lessons at the beginning. It is like using an app on a tablet where the motto is: just start, use and experience it.

3.4. The SFM Method

In the Stars phase of idea processing (section 3.2), the crucial question is how one can evaluate the solution ideas proposed by the I-team members. We have here a situation in which a wide variety of statements from the forum postings have to be put in some kind of order. A suitable generic paradigm for this was found in the SFM structural model by considering that a great many of the contributions could be viably interpreted as direct or indirect assertions either about needs or about objectives or solutions. The SFM method (Solution Finder Model) is a structured, formal procedure to be applied during interactions in small, medium or large groups where there is a need to collaboratively develop shared solutions of a high quality standard ("clean") and in a short period of time ("quick").

The essential core characteristic of the SFM, which has its theoretical foundations in cybernetics, system engineering and radical constructivism, is the idea of the unity of 3 relevant elements: needs, objectives and solutions. The term unity refers here to the guiding principle of SFM: in order to find a high quality solution, the 3 elements should always be explicitly connected to build a coherent triad (the unity). The SFM is used as an analytical tool, where the starting point appears in the form of a problem for which you want to find a solution. The following example from daily life shows how the method works: a) Problem (starting point): "I'm hungry"; b) You may think, that "eat" is the solution to the given problem. But this is only the case if "I'm hungry" is the need and "be satisfied" is the objective; c) But if the objective is "to reduce weight", then the solution will be "do not eat" and the need occurs still as "I'm hungry"; d) It is also possible that "I'm hungry" is the objective, then the need can be "loss of appetite" and a solution could be "serious sport". It is also possible that "I'm hungry" is a solution, then "treatment of anorexia" could be the need and "eat" would be the objective. As shown in the example, "I'm hungry" can be a need, objective or solution. By applying the Solution Finder Method, a group will become aware of these different possibilities and avoid the confusion that emerges when group members use the same term but are not aware that they are interpreting it differently, either as a need, objective or solution.

4. The eCiC Online Tool

Basically the eCiC Online Tool has to provide support for enabling the interactions and tasks required by the eCiC interaction method described in the previous section. Our current implementation is based on the Moodle system, which is widely used in education around the world. Moodle provides all the tools that we need for implementing the eCiC interaction method: a forum, wiki, database and document. Our guiding principle in designing the user-interface of these tools was to lower the cost of participation as much as possible, which is also one of the requirements that have proven relevant for supporting community life (Agostini et al. 2005). Our solution for reaching this objective was to offer only three buttons on the main page which would be focused on the three main activities of the students: a) entering ideas; b) contributing to the idea processing; c) acquiring information (Fig. 1).

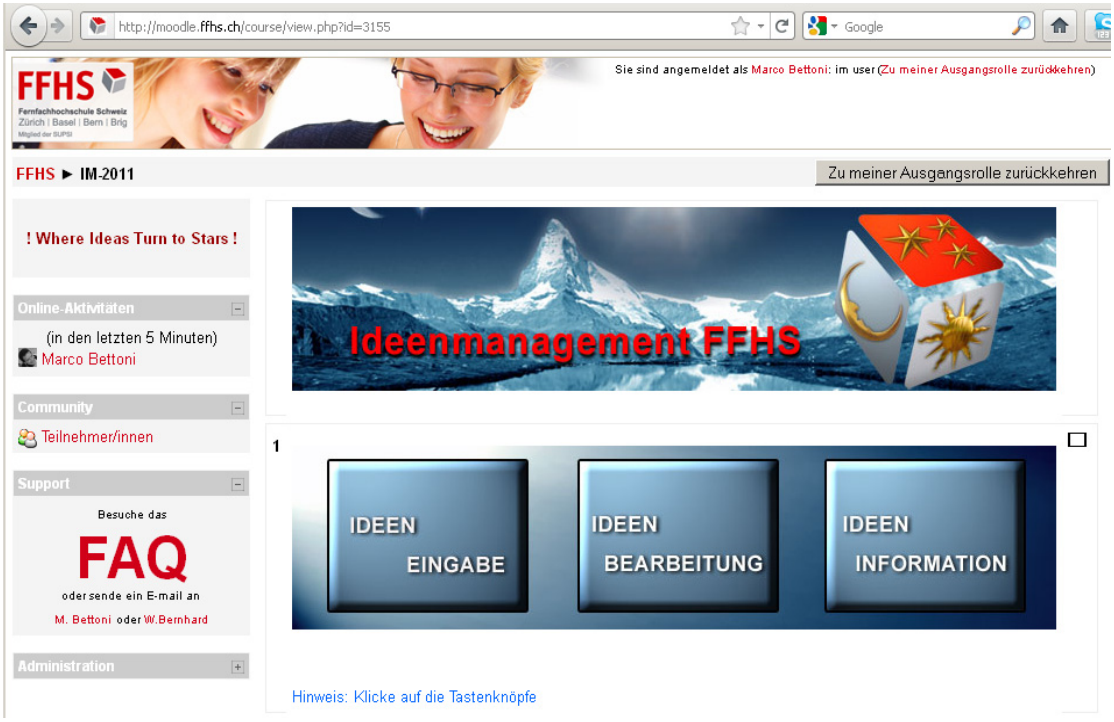

Fig. 1 - Main page of the eCiC online tool (in German)

Clicking on the first button to the left, "IDEEN EINGABE" (idea entry), the student gains access to the idea entry forum where he/she can create a new discussion and enter the idea. In the header of the same page, a short description of the forum is provided as well as access to a set of three one-page manuals describing: a) the eCiC system; b) how to participate; c) how ideas are selected for processing. In order to simplify the interface, the team building forum used for setting up a team of students has been hidden from the students' view; access for the students is provided by a facilitator who publishes a link to the appropriate discussion in the "News" forum.

The second button, "IDEEN BEARBEITUNG" (idea processing) gives access to the idea processing forum where students can select the appropriate discussion from a list (each idea has an own discussion) and read the available posts or post their own contributions. In the header of this forum page, a short description of the forum is provided as well as access to the idea processing wiki where the facilitator at the end of each phase summarises the results of the idea processing. A link to a forum search functions allows students to search for any keyword across all the discussions.

Finally the third button, "INFORMATION" gives direct access to the main page of the idea processing wiki which contains a list of all wiki pages, one per each idea, divided in three sections, one per each processing phase. In

the header of this wiki main page, two links provide access to further information: a) the database collecting detailed information about each idea and b) the News forum.

5. Applications in Education

In the following three examples, we give a couple of suggestions of how the eCiC system could be applied in education for designing school lessons by integrating student input (example 5.1) to ensure the continuous improvement of learning in school, based on student feedback (example 5.2) and for students who want to eliminate personal learning barriers on their course (example 5.3).

5.1. Subject empowerment with eCiC

What. The eCiC system can be applied to design school lessons by integrating student input. Students collaboratively develop suggestions of how a subject can be taught, regarding their individual interests. To this end, students use eCiC to share which aspects of a topic interest them and on which they would like to focus on as well as how they would design the learning of these aspects. Finally, one or several of these suggestions can be implemented in class.

How. The following steps are one option to empower the students' role as teaching co-designers with the help of eCiC: A) The teacher announces a new teaching topic. Ideally he/she does it as future outlook in order to provide students with some time to work on the assignment. Beside the topic, the teacher also explains to the students what they have to do. That means: he/she invites them to share: a) What they would like to know about this topic and b) How they would like to learn it. Additionally, he/she shows them how to use the platform for submitting and editing their inputs. Finally he/she formulates a couple of guidelines (how the assignment has to be done) and defines deadlines (when the assignment has to be done). B) The students hand in their input by using the platform. They write down in the forum what they would like to know and how they would like to learn it. C) Then, teams are built according to the teacher's guidelines. To this end, students join whichever idea submission they would like to work on. A submission which does not have at least two people who would like to work on it is eliminated. Thus, the number of submissions to be edited will be regulated. D) As soon as the teams have been formed, the groups work on their submission by going through the 3 phases of the model: a) they define the idea by looking at it from different perspectives; b) they look for potential solutions for the idea; c) they define ways implementing it. D) After the submissions have been edited by the teams and suggestions for their implementation have been developed, the teacher starts a vote in class (f2f or virtual). Those idea(s) with the most votes is/are then implemented in class.

Why. With this method, teachers can promote collaborative creativity. It allows students to become active co-designers of lessons by bringing in their ideas and proposals. Thus, the method is a complement to the traditional model of learners vs. teacher. It is expected to attract the students' interest and to engage them to incorporate and share their own views. The method offers the opportunity to empower learners to overcome their perception of a lack of power and influence.

Example. The teacher informs his/her students in autumn that they will be dealing with the topic of "mental disorders" after Christmas and asks them to write down in the forum which elements of this topic they are most interested in. One student suggests exploring the question of how people with a mental disorder go about their daily life. Together with 3 other classmates, he/she first defines the question (What do we want to know? Do we want to know which definition of daily life those people have? Or do we want to know in which way their daily life differs from ours? etc.), before looking for solutions (How can we achieve what we want to know?). Finally they identify how the solution can be implemented to reach the goal (by what can we achieve what we want to know?). In this example, the team decides to invite people suffering from a mental disorder to school to share their individual perception of everyday life with the students. Since most of the students would like to implement this idea, the teacher organises such interviews with the help of his/her students.

5.2. Continuous Improvement of Learning (CIL method)

What. The CIL method is an application of the eCiC system, ensuring the continuous improvement of learning in school based on student feedback. The value of conventional student feedback is often limited. Mostly students can decide only between yes or no answers (e.g. did you like the course? Yes/no). Less often they are also asked to explain what they suggest to improve things. But they are virtually never asked to describe how they imagine implementing these suggested improvements. Thus, the CIL method allows students not only to formulate suggestions about what to change in a course, but also to develop concrete solutions as to how to achieve this.

How. For the continuous improvement of the learning process, both from teachers and students: A) Students are invited to submit their feedback by using eCiC. This can be at any point of a course, a lesson, a module etc. and can point to any teaching aspect (teaching methods, subject matter etc.). They write down concrete points in the forum

which need improvement, in their view point. B) As soon as all students have handed in their feedback, they start to create teams of two people to edit the submitted input during the three phases of the eCiC method (see 5.1). To make sure that all submitted evaluation points are considered, each student is responsible for finding a classmate who is going to process his/her input at the same time. C) By the end of the third phase, the teams will have identified concrete ways of improving the defect identified at the beginning. These will be collected by the teacher who will discuss them with the students before applying as many as possible of them in the teaching.

Why. By offering students the option to work collaboratively on what they perceive to be wrong or lacking in their learning, they are more actively involved in the teaching quality assurance. On the other hand, teachers benefit from meaningful feedback from students which contributes to the continuous improvement of their own teaching.

5.3. Eliminating Learning barriers with eCiC

What. The eCic method can be applied for students who want to eliminate personal learning barriers within their course. They can use eCiC as an instrument like a megaphone for the teacher and also experience whether other students have the same problem where a better solution would be appropriate. It is a common situation that students experience unreadable slides, overly fast lectures or incomprehensible lessons. But nobody wants to complain or be seen in a bad light by the teacher.

How. With the help of eCiC, the students can share and discuss educational barriers which they explore within the class in a collaborative way. They are not alone with their problem and while using eCiC, they will explore better solutions and possible problem solving ideas which they can provide to the teacher. By using eCiC, they can propose better solutions for the course.

Why. Students are very exposed to a teacher if they suggest better solutions for teaching. Because of this fact, a collaborative suggestion will be more effective, even if it is anonymous and can be delivered to the teacher as a whole, as the opinion of the class.

Example. This example is a real one, made with students on a course. By using the eCiC system, they find out that they can react better and even improve their learning on courses if they give the teacher immediate feedback about good and bad things on the course. For example, if the slides are unreadable or the examples are too complicated. At the end, the collaborative solution of the students was to have a learners' speaker who expresses their concerns to the teacher. In this way, the learners' speaker has an official function for the class and does not speak on his/her own, so the teacher speaks more to a learning-representative of the class than to a student. The students also found a creative solution which helped them a lot to improve their learning together with the teacher.

6. Conclusions

To create, share, discuss, analyse and cultivate new ideas in a collaborative way is not an easy task, especially when the participants are distributed over a wide area and cannot meet face to face. On the other hand, web-based tools create a great flexibility in space and time for working together in a collaborative way. To be successful, it needs a guided process which must be as simple as possible for the user as well as an acceptance of the tools used. But this is still not enough; when a wide range of people discuss ideas it can go forever if decision making is part of the process. So it also needs a powerful method in the analysis part of the ideas handling. The eCiC system was developed under these circumstances, tested in real cases and improved over time. Technically, we used the open-source learning management system MOODLE, because it is well-known by the students and therefore already accepted as a common web-tool in learning. The guided process of entering an idea and discussing it is supported by a simple three button design, with the idea that even inexperienced participating users can immediately use the system in a self-explanatory way. The participating user only deals with discussion forums, while the facilitator also has to summarise the results in a wiki. The different roles make it possible to integrate as many interested people as possible without the need to provide lessons on how to handle the system for all. A great help is the use of the solution finder method, which enables switching from a divergent and open thinking phase to a convergent analytical thinking phase for all participants. Before the eCiC system was used with students in learning processes, it had its application in distributed research teams. The solution finder method itself came out when participative decision and solution seeking processes were needed in communities of practice applications within companies. Although the MOODLE system can also be used by other institutions or companies for free, the eCiC does not depend upon this. The concept of eCiC can be setup in other platforms as long as they provide forums for discussions and wikis for information gathering. We can therefore think of future developments of eCiC where other web tools can be used like social networks or wiki-spaces. But our recent tests with social media tools have shown that there are still severe limitations due to the restrictions of rearranging elements in the layout in order to simplify the user-interface.

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