Educational Patterns for Generative Participants: Designing for Creative Learning

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In, this paper, we propose a pattern language for *Generative Participants*. Recent education more and more requires methods to cultivate creativity in the students. A *Generative Participant* proposed in this paper is a teaching style aimed to cultivate creativity in its students. In a project-based environment, a *Generative Participant* teaches by actually participating in creative activities to stimulate the student's learning. Here we present four patterns for *Generative Participants*: Mining of Relationship, Learning Through Accidents, Showing the Art of Creation, and The Challenging Point. These patterns are meant for teachers, facilitators, and other educators. We believe our patterns would helpful to a practice of such educators.

1. INTRODUCTION

In today's society, creativity - the ability to create something - is becoming more and more important [1] [2]. Education in such times requires cultivating creativity in the learners to create the coming new society with their hands [3].

However, definitive ways to support such a learning style does not exist, and many teachers are continuing to search for their style. For instance, there are the thoughts of J. Dewey [4] who suggested experimentalism and the educational style of Project-Based Learning. M. Resnick promotes the style of *tinkering* as an educational style. He writes: "tinkerers use a bottom-up approach" and they "start with tentative plan, but they continually adapt and renegotiate their plan based on their interactions with materials and people they are working" [5].

In this context, we suggest a Pattern Language in order to support teachers who try to cultivate learners' creativity. We will present four patterns from the language in this paper. This language is based on the patterns proposed in the *Pedagogical Patterns for Creative Learning* [6]. The following patterns are proposed in this previous work:

Discovery-Driven Expanding
Set goals in the curriculum according to the stage of learners, where they can expand the ability gradually through the accumulation of creative learning: individual, interpersonal, and collaborative achievement.

Challenging Mission
Design missions that are effective for learning, attractive, and worthwhile to challenge.

Generative Participant

Encourage learners in thinking, in communicating, and in creating, as a participant in the activity rather than a teaching actor.

This time, we propose four patterns connected closely to *Generative Participant*s. A *Generative Participant* is a person who actually participates in the creative activities with the learners. *Generative Participants* stimulate learners from among the project to promote their learning. In education scene, there are some kind in project activities. In this paper, we define projects as activities which centered on problem solving and create one product in small groups. The project in this paper means setting the problem which have no correct answer and have a connection with the real society and challenging to solve that with other learners. To be concrete, it is activities that learners create something in a small group. The examples of the product are a leaflet, a presentation, a drama, and a film. About the number of members, we recommend that you work with 6 members but you can select to make it easier to do. And, it requires to show the output of the project to people who are not members and to get feedback from them. In the process *Generative Participants* create an environment where the learners can easily make new discoveries and ideas, and provides feedbacks for the learners.

Since the skills described here are related to the creation process but at the same time so essential for all educators, the patterns can be adopted by people such as creators and project managers who commit to creative activities for them to become educators also. The patterns in this paper assist teachers who help learners discover new ideas through creation. For the purpose, the patterns focus on describing how to effectively participate in the creating process with learners to make chances for such discoveries.

These patterns for *Generative Participants* shown in this paper have some point in common with existing Pedagogical/Educational Patterns, but also have points of differences. For example, the kind of a teacher proposed in the *Pedagogical Patterns for Active Learning* [7] [8] assists learners to cultivate their own knowledge and ability. Since these patterns help the teachers to assist learners to participate in classes through the learner's autonomy, there are descriptions on how to assist learners find their autonomy.

2. PATTERN FORM

The patterns we show in this paper are intended to support the teachers who assist learning that fosters learners' creativity. These patterns will help look at the current situation, and take small actions towards the realization of learning by creation for the learners. These patterns are meant for teachers, facilitators, and other educators to become such a *Generative Participant*.

The patterns in this paper are written in what is similar to the conventional pattern format: pattern name, introductory sentence, illustration, context, problem, solution, consequence; the sentences after the illustration describe context of the pattern; a bold-typed sentence just after the word "In this context" is the key point of problem; a bold-typed sentence just after the word "Therefore" is the key point of the solution; and sentences after the word "Consequently" describe consequences of the pattern; and paragraphs after the separator * provide an example of the solution; a list after the separator * shows related patterns with existed pedagogical patterns. These patterns were created on the basis of interviews with Chikara Ichikawa of Tokyo Community School, Japan, and with Takashi Iba of Faculty of Policy Management, Keio University, Japan.

3. PATTERNS

Here we present the *Educational Patterns for Generative Participants*. It is composed of 15 patterns. 15 patterns compose whole image along the process of practicing the project (Fig.1). The three patterns around the center are core of our patterns and give influence to all of the other patterns.

The *Educational Patterns for Generative Participants* consists of four processes: 1.When you start a new project. 2.When you are in the process of the project. 3.When you are complete with the project product 4.When you think of the next project.

Basically, the learning style proposed here fosters the learners' creativity based on a "project" in which the teacher and his learners create something new together. In each phase of the project, the teacher shows the process of producing new discoveries with their own hands. We will provide four patterns from the language (Fig.2): *Mining Relationship*, *Learning Through Accidents*, *Showing the Art of Creation*, *and The Challenging Point*. Patterns we propose here are suitable to use in the project within any period of time, but we wrote these patterns with six- week project in mind.

Fig.1: Overview of the Educational Patterns for Generative Participants

When you start a new project

No.1 Mining of Relationship

When you think of the next project

No.4 The Challenging Point

When you are in the process of the project

No.2 Learning Through Accident

When you are complete the output

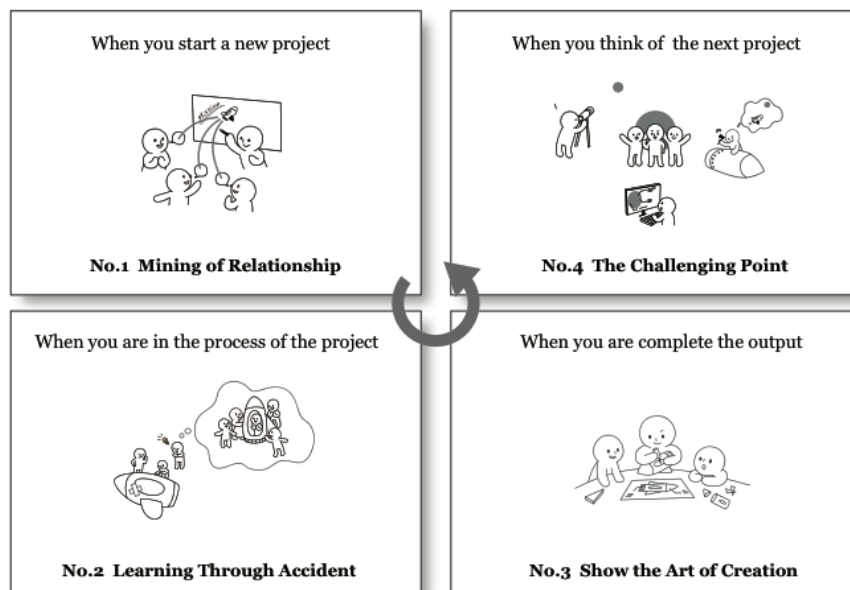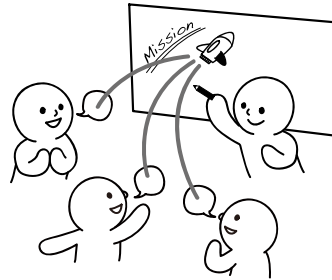No.3 Show the Art of Creation

Fig.2: Four patterns in this paper arranged in order f the process

No.1

Mining of Relationship

Make the project learners' own business.

You are about to start a new project with learners who have various interests.

▼In this Context

You cannot force a learner to participate, just by explaining the purpose of the project. Even if learners have high motivation for doing project style learning, they usually won't get interested in the project only by hearing an explanation of the project. However, it is almost impossible to design the project to fit to all of the individual interests. In addition, even if the learners appear to be working happily, it might be just that the learners are enjoying the activities that the teacher has planned. The learners in such posture don't take action like inspecting the necessary knowledge for the project or devising their own way of working.

▼Therefore

Explore each learner's interests, and make a connection between the interests and the project. First, explain the project. You should ask the learners to talk about what they think about the project, and ask them the reasons why they think so. Dig down each of the words they say – they all relate to their thoughts. At this time, you should write out on a blackboard or a large spread sheet of paper the learner's words and arguments so that all participants of the project can see each other's thoughts. Then, explain again the project by pointing out how the learners' thoughts and the project connect. In the process, make the learners understand how they actually relate to what they are about to create in the project. And these actions are effective when you work on a short project. It is advisable that you work with 3-10 learners. And, if you work with over 30 learners, it is almost impossible to ask all learners. In that process, it is better to pick up the common thoughts or make groups and speak thoughts of the group. When you take six weeks for the project, we recommended to take one week for this process.

▼Consequently

Learners can see the connections between the theme of the project and their individual interests. They also will see relations between their own interests and others through the process. By understanding what the learners are about to create through their own thoughts, each learner will be able to imagine what they will be able to after the project and how it will turn out. Also, the learners will be able to find the meaning of participating in the project, and likely will participate more actively. Furthermore, by talking to each other about their own thoughts, they can find out the differences from the other learners, which allows them to develop the attitude to accept a variety of values. Actually, it is difficult to adapt this patterns to learners who don't have high motivation. In the case, you have to think the order of projects when you design the curriculum. **Discovery-Driven Expanding** which is a pattern proposed in *Pedagogical Patterns for Creative Learning* [6] is effective at the time. Put the project which cultivates learner's motivation for project style learning at first, and then, put other projects.

* * *

For instance, when T. Iba, an associate professor of Keio University, starts a project with students, he gets his learners to perceive it as their own matter, and connect their interests with the project. When he works on a project for creating a pattern language in his laboratory, he persuades the members to talk about their experiences concerning the theme of the pattern, and also grasp a shared understanding of how such experiences are related to the project. Specifically, when creating a pattern language about creative collaboration, the members of the project first shared their ideas based on their experiences about collaborations that they felt were creative. T. Iba shows his interests and passion towards their ideas and suggests their significance in order to encourage the members. As a result, every member can discover differences between other experiences and can gradually visualize the whole structure of creative collaboration.
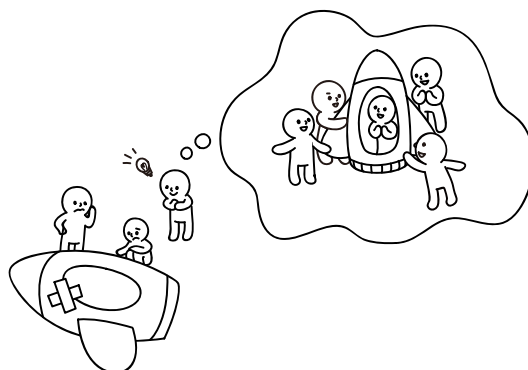
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ONE CONCEPT -- SEVERAL IMPLEMENTATIONS, EXPAND THE KNOWN WORLD, PHYSICAL ANALOGY

No.2

Learning Through Accidents

Accidents will become a chance for learning

You encountered an unexpected accident in the process of the project.

▼In this Context

You take too much work of the project on yourself to resolve the accident. Projects with new challenges will hardly go exactly as planned. However, from the sense of responsibility as a teacher, you tend to think failures aren't allowed when unexpected events occur in the project. So you tend to make a correction to the course of the lesson plan and curriculum. But, many problems can't solve alone, and the situation can become all the more complicated because of your brief solution.

▼Therefore

Grasp the mere accident as the chance of learning, and seek a solution for it with learners. Disclose to the learners that the incident in the project is unexpected, and you don't yet have a solution. Then, consider reasons why it occurred and how to put forward the project from now on. And then, convey clearly the opinions that you have for a solution, and then ask the learners for suggestions to consider a solution together.

▼Consequently

Through the experience, learners will also learn how to deal with unexpected accidents, and investigate reasons for an idea of a solution. An idea of a learner may be a breakthrough of the project. You can get time for thinking for yourself while consulting questions to learners. And, the accident can become a good chance for learning trouble-shooting skills in constantly changing situations. It will also become a chance to review the process of the project by thinking about a problem of the project and the reason for the problem.

And in this scene, some learners would underestimate teachers. You should teach learners *"NOBODY IS PERFECT"* in Pedagogical Patterns Editorial Board [9], and you should build a relationship with them not as a normal teacher but as *Generative Participant* through whole of the school life.

* * *

When an accident occurs in a project, C. Ichikawa, the principal of Tokyo Community School, always opens up the matter to his learners and transforms the accident into a learning opportunity. C. Ichikawa organizes "Inquirers Team Shonan," a community for educators. In this community, he held a workshop where he sank many kinds of fruits into water, and the participants predicted which fruits sank, and which floated. However the result of the experiment differed from result of the same experiment he did before. However, rather than staying confused, he asked the participants why the result was different from the past experiment. Although the participants hesitated from being instructed to solve a problem (which ultimately was not solved), they diligently analyzed why certain fruits sank or floated. In the end, although they couldn't figure out the reason, by considering many possibilities, discussing, and sharing their hypothesis, all participants learned significantly. As a result, all participants were able to find many discoveries.
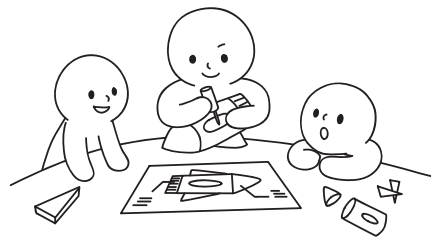
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NOBODY IS PERFECT, REFLECTION

No.3

Showing the Art of Creation

The best way to initiate learners into the process of creation is
to show you yourself involved in it.

Learners are working hard to bring up the quality of their creative work to show audience.

▼In this Context

You feel the product hasn't reached a quality that is showable to a public audience. To motivate learners to improve the quality of the product and feel the connection with the society through the project style learning, it is very effective to show a public audience the product of the project. However, the learners don't know the quality level to aim for or how to get there since they have little experience in creating something to show to a wide audience. It is difficult for them to notice what points they should polish up more. Nevertheless, you as a teacher are afraid of taking away their chance to learn by themselves, if you tell what to do.

▼Therefore

To show learners the process and the way of creation, give chance to polish up their skills with your own hands and polish the product with learners as a *Generative Participant*. Show the learners that parts of the product need to be revised, and also show them the process of bringing up the quality of it. You work on the process of creation as a demonstration or you work on only he core of the project. At that time, don't do everything by yourself and leave some points the learners can try to polish the product by themselves. For instance, when you are writing documents or making a presentation, sit next to the learner and tell learners what and how you did to make the product better.

▼Consequently

Learners will try to imitate your art of creation as a model and they will gain the sense and skills that are needed to raise a quality of the product you require. In addition they will get a sense of what it feels like for a project to have a high quality. Also you yourself get a chance to re-consider what you usually do or feel in creative activities, and discover parts that you are not aware of.

In this scene, the output is made not only by learners but also the teachers, making it difficult to grade them only by reviewing their output. Therefore it is necessary for the teachers to observe and record the participation of the students. It may also help to make them to make a portfolio or a report and so on to show what they learn through the creation.

* * *

In projects of T. Iba laboratory, T. Iba actually joins in the discussions and activities when members of his laboratory are producing outputs of the project. He shows how to bring the quality up so the learners can acquire specific knowledge and skills for creative activities. In the Collaboration Patterns Project in 2012, T. Iba, an associate professor, worked together with students. And he planed to release the pattern language at the forum of his university. As a participant, T. Iba avidly demonstrated the actual process of how to raise the quality to learners. He also drew the illustrations of the Collaboration Patterns and he showed points that require care, and methods to raise the quality. Also, when learners were checking the sentences of the patterns, he read the sentences aloud and commented whether he felt empathy with it. Although this may be an ordinary practice for teachers, he tells the learners about his practice on purpose, and conveys knowledge and skills to bring the quality up. And, he and his members created a sensation at the forum with the pattern language.
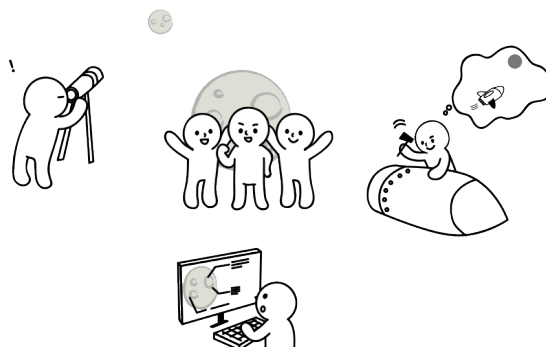
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FAIR PROJECT GRADING, SEE BEFORE HEAR, TEACHER'S LANGUAGE

No.4

The Challenging Point

Add something new to discover into the project every time you do it.

You are thinking about what to do for the next project.

▼ In this context

If you repeat the same project conducted before, the reactions of the learners will not be new for you. When the same projects are repeated several times, you would come to be able to roughly predict what kinds of reactions the learners will show, what kinds of things the learners will stumble on, or what kinds of results will be gained. This will bring your facilitation skills of the project, but it will become hard to share the excitement of discovering something new with the learners. In addition, the learners will less feel the challenge for the project if they know that you already know the answer to everything. They feel the activity is not a creative project but only a project of a course of study.

▼ Therefore

Add new aspects to the next project so it becomes challenging for you also. Through the next project, meet and share new discoveries with the learners. Working on a completely new project is the best. However, even if the project has to be done about the same topic as before, you can search for and add new aspects to the next project that was not included before. This way, you can always meet new discoveries in every project you do with the learners. For instance, you can design new projects from the same theme, or put a new restriction to a project by changing tools you use or the number of members. You can also approach the next project from a different angle and adopt a process that is different from the past, so you can explore the possibility of the project itself. If you don't have an idea that what to try in the next project, you should do as below. When you reflect on the project, put in order clear things and unclear things. Think of what you leave undone in the previous project, the feedback to learners' outcome, and why you and learners fail in the project if you have a failure. What you think of the prior project contributes to scheming next your challenge.

▼Consequently

This way the project will be challenging for the teacher as well. By looking at how you tackle a challenge, the learners can watch, create together, and learn the attitude towards authentic creation. Also, by starting the project from a different starting point, its results will most likely differ from the previous results. Therefore, even though working on a similar project as before, you can find a new challenge to enjoy and discover something new with the learners as a *Generative Participant.*

<center>*   *   *</center>

When T. Iba starts a new project, he changes the theme of the project. Even if the project is similar to another project, he clarifies and sets the challenging points for him. By keeping an attitude to challenge, he can always be a *Generative Participant* in learning. The T. Iba laboratory produced Presentation Patterns in 2011, and Collaboration Patterns in 2012. Although the process of producing those patterns was similar, by changing the theme to a topic he was not familiar yet meaningful, he was able to solely enjoy discoveries. Moreover, T. Iba increased the number of participants in the Collaboration Patterns project, and also recorded its entire process in a video. This was actually a challenge to clarify if the project can still do well after changing the number of participants. He was also preparing for a future challenge which consisted of showing the video of the working process of the pattern language in PLoP (Pattern Language for Programs Conference: The international conference on pattern languages of programs).

<center>*   *   *</center>

NEW PEDAGOGY FOR NEW PARADIGMS

4. THE SUMMARY OF THE OTHER PATTERNS

Here we show summaries of 11 patterns which we don't insert in this paper. Each patten name is in bold faced type and the summary follows after that.

* * *

Creative Education
Nowadays the state of society changes rapidly, so it becomes more important to get creativity. Try to start and struggle a project in which you and learners make something together. You'll be a Generative Participant through the projects.

Discovery-Driven Expanding
It is difficult for learners to join in the collaborative project suddenly. Design both the content of the project and their learning so that they can expand their discovery through the creating in the project.

Abductive Mission
If you only think about what to teach, the project will be less attractive and meaningful. Develop the challenging mission which related to our society. That will encourage learners to participate in the project.

Generative Participant
It is difficult to foster leaners creativity only by teaching a static knowledge. Participate in the creative project and join in the process of creating. You should make the whole process more creative.

Editing Discovery
The discovery of learners are sometimes overlooked while just talking. Write the their opinion or discovery on the blackboard. The writing will stimulate their discussion.

Open the Project
You are a part of creating process, so you can't evaluate their output objectively. Open the output of the project to the public and receive the feedbacks from an audience.

Proactive Mirror
When you concentrate on proceeding the project, you often overlook learners' personal problem. Talk with each learner and draw out more clear and better idea.

Provoke for High Quality
Sometimes learners lose their motivation for creating. Give provoke to encourage them to re-start creating in the project. They and you will refine the output.

Celebrate Completion Together
The degree of commitment differs a member to member. Set the event to celebrate the completion of the project. The learners will get a feeling of achievement.

Responsible Reflection
If you and the learners only talk about what you did well or bad, it can' t be meaningful reflection. Then you should give learners a feeling that they couldn't complete the project very well.

Tinkering with Hard fun
You can't teach learners how to be creative in the project, then you should keep trying creating something and inquiring.

5. CONCLUSION

In this paper, we proposed a pattern language for *Generative Participants*. A *Generative Participant* is a person who supports learning in which learners creates something new in the process. The four patterns in this paper is a small set from the *Educational Patterns for Generative Participant*s, and the set will continue to grow as more patterns are found. Interview with other teachers are planned for the search for new patterns of the language. At the same time, we would like to explore the relationship of this *Educational Patterns, Patterns for classroom education* and so on, with other areas besides education in the future [10]

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