Online Education Patterns, Part 2: Patterns for Creating a New Form of Learning

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In this paper, 12 patterns for *CREATING A NEW FORM OF LEARNING* from Online Education Patterns are presented. Online Education Patterns consists of 37 patterns for creating great online classes. This paper focuses on patterns for *CREATING A NEW FORM OF LEARNING*, to create classes and learning experiences that utilizes the online setting and its positives. By mining the experiences of 25 teachers who have made efforts to create great online learning at university, high school, junior high school, and elementary school, we came to the following findings; MAKING THE MOST OF SEPARATE ENVIRONMENTS helps take advantage of the fact that everyone is participating in class from different locations; Because students are participating in class using a computer or tablet, DESIGNING LEARNING THROUGH THE INFOSPHERE makes it easier to do things that would have been difficult to do in a real classroom; In order to create learning and discoveries for the class and class as a whole, DEVELOPING A WHOLE FROM PARTS helps weave learning and discoveries together; Make use of not only synchronous but also the asynchronous option of online learning to allow students to learn BEYOND THE TIMETABLE. To realize the above, this paper presents the following 12 patterns: *Discovering in Proximity*, *Close Reality from Afar*, *Benefits of Anonymity*, *Creator's Point of View*, *Parallel Rooms*, *Others' Thoughts*, *From Small Groups*, *By Students for Students*, *Weaving Discoveries*, *Asynchronous & Synchronous Mix*, *Viewing Period*, and *Additional Clips*.

1. INTRODUCTION

Education has been devised, designed, and evolved in various ways according to the circumstances and environment at the time. More recently, with the COVID-19 pandemic, it became a catalyst in giving rise to unprecedented developments in the field of online education.

Under circumstances in which classes were rapidly forced to move to online spaces, many educators were still able to find various ways to provide ideal learning. Even classes that would have been considered more suitable for offline courses, such as those that involve the use of physical materials, were able to come up with innovative strategies and methods for teaching and learning, and even resulted in opportunities that became available because of the switch to online [1]. Medical and health educators, a field that seems to be more appropriate for offline learning, also concluded that an online setting is "a favorable environment for academic continuity" [2].

However, while there are those who found ways to create successful online learning experiences, there are still many teachers who are struggling to create online classes that are not merely replacing ways of teaching and learning in a traditional school setting to an online setting. Teachers who are used to teaching in real classrooms tend to be more conscious of what is lost in online classes.

What are teachers teaching with ingenuity doing to make it work? In order to uncover this question, we asked teachers who were designing their online classes with ingenuity what kind of tips and tricks they were using. From the creative practices, ideas and innovations of the teachers, we formed a pattern language to make it easier for everyone to use. We named this pattern language "Online Education Patterns: A Pattern Language for Designing Styles in the Online Age."

In part 1 of the Online Education Patterns series, patterns from the first category, LINKING SEPARATE WORLDS, were introduced. The first category is where we have come to understand that despite physical distance, it is possible to design online classes for teachers and students to feel closer and to feel each other's presence [3]. In this paper, the 12 patterns of the second category, CREATING A NEW FORM OF LEARNING, are introduced. Patterns in this category provide hints on designing online classes for teachers and students that provide experiences only an online environment can realize, and make both educators and students realize being online is not at all disappointing.

In the following sections, the creation process of the pattern language is described, followed by the overview of the whole structure. Full descriptions of the 12 patterns are then introduced, and student responses and examples of patterns are presented in the section after. At last, short descriptions of all 37 patterns in Online Education Patterns are shown in the appendix.

2. CREATION PROCESS

Online Education Patterns was created in accordance with the creation process developed in Iba lab and A Pattern Language for Creating Pattern Languages [4]. The process contains three phases: Pattern Mining, Pattern Writing, and Pattern Symbolizing, and they were slightly redesigned as they were conducted online. This section explains each of the phases on how Online Education Patterns was created.

2.1 Pattern Mining

The Pattern Mining phase is where seeds of patterns are discovered and created, and the structure of the whole pattern language is built.

First, dialogical minings were conducted. This is an approach where we dive into the experiences of practitioners in the domain of the pattern language together through dialogue [5]. Every mining session was approximately one to one and a half hours long and was conducted with one or two teachers per session. Teachers were asked for information on what practices and actions are important for creating great online classes, how to carry them out and why they are important.

A total of 25 teachers were mined, and the distribution is as follows: 13 university professors, ten high school teachers, one junior high school teacher, and one elementary school teacher. Most of the teachers began online teaching after the COVID-19 pandemic and vary in age, gender, and subject areas. The different areas of teaching include physical education, art, architecture, workshop design, politics, and more. Also, the number of students in the classes that the teachers taught varied as some were around 20 students, some around 100 students, and one class with nearly 1000 students. Most of the university professors chosen were those who had been featured in the "Online Classes Good Practices" of Keio University Shonan Fujisawa Campus as good examples that utilized the benefits and advantages of the online environment [6]. Other teachers were introduced by students or teachers as those who conducted good and creative practices for online learning.

Then, from the mining dialogues, important practices for creating great online classes and how to practice them are extracted, while determining and grasping the essence of the practice to create seeds of patterns. The pattern seeds are written in a simple format of Context, Problem, and Solution, which makes each idea easy to understand and easier to handle when weaving the whole of the pattern language. Writing in this format is also a part of the Pattern Writing phase.

The whole of the pattern language is woven and structured using the pattern seeds and relations among them. This process begins with a bottom-up approach, considering the readers' perspectives as well as the heuristic level of each pattern. Then with a top-down approach the significant cores of the pattern language are found and defined, and consequently a total of 37 patterns, and the three main categories with four groups in each were structured and generated.

2.2 Pattern Writing

During the Pattern Writing phase, full descriptions of patterns are written and deepened.

This phase begins when the pattern seeds are written in a simple format of Context, Problem, Solution, during the structuring of the Pattern Mining phase. The pattern seeds are then nurtured and grown into patterns with full description, including the Context, Problem, Forces, Solution, Action and Consequence. The Forces are added to explain why the Problem occurs, and the Actions give examples or descriptive ways on how to practice the Solution. The Consequence is written using positive words so that people who read the patterns can have hints

on the positive results of practicing the patterns and will want to practice them (Excitement for the Future, in A Pattern Language for Creating Pattern Languages [4]).

Patterns were written individually, reviewed in group discussions, and then rewritten individually. Individual revisions and group discussions were repeated so that the patterns can reach a high level of quality. When writing the patterns, details discussed in the dialogical mining, the positions of each pattern in the whole pattern language, and experiences that we as students and authors, were carefully considered. As the essence and details of each pattern becomes clearer throughout the writing process, it is necessary to reconsider the relationships and positions of patterns and re-weave them.

2.3 Pattern Symbolizing

The Pattern Symbolizing phase, the last phase in creating a pattern language, is when a Pattern Name and Introductory Sentence is added to each pattern. This phase is done in parallel with the Pattern Writing phase.

A Pattern Name has the purpose of describing the content of the pattern in a simple, symbolic and attractive way. Especially, the Solution and the contrast between the Problem and Consequence of the pattern are described. Pattern Names are not merely words that convey the meaning and content of the pattern, but attractive words that give a glimpse of hope and attract people to practice the pattern. The names are also chosen so that people can use the pattern name naturally in sentences of conversations when referring to the pattern.

An Introductory Sentence is a sentence that complements and reinforces the Pattern Name, conveys the attractiveness of the pattern, and makes people want to read it. Pattern Names are very short and made for ease of use, so it is not possible to include all the elements and nuances that are represented in the Solution and contrast. Therefore, the elements that are not expressed can be in the Introductory Sentence. If a metaphor is used for the Pattern Name, the sentence can be used to help readers of patterns understand the meaning of the metaphor.

3. ONLINE EDUCATION PATTERNS

Online Education Patterns, which contains positive and practical wisdom from teachers who are doing creative practices, are created for the purpose of helping teachers become creative in designing their online classes. This pattern language consists of 37 patterns overall. Figure 1 shows the overall structure and pattern names of Online Education Patterns. The core pattern at the top is No. 0, Redesigning for Online Learning. And there are three categories to achieve this: LINKING SEPARATE WORLDS, CREATING A NEW FORM OF LEARNING and BUILDING A SENSE OF BELONGING. Each of the three categories consist of four groups, and each group contains three patterns.

The patterns introduced in this paper are shown below. Note that each pattern is marked with one, two, or no asterisks (*) on the right shoulder of the pattern name. This is modeled after the style of Christopher Alexander's A Pattern Language, where he marks asterisks for each pattern [7]. Asterisks in Online Education Patterns means how much priority should be given in incorporating the pattern in creating great online classes, although Alexander uses asterisks to show how true, profound, and certain the patterns are. The patterns that are general and could be used by many people have two asterisks, and the number of them decreases as the pattern could be used in more specific situation and is not always for everyone.

- Discovering in Proximity *
- Close Reality from Afar *
- Benefits of Anonymity
- Creator's Point of View *
- Parallel Rooms *
- Others' Thoughts **
- From Small Groups **
- By Students for Students *
- Weaving Discoveries
- Asynchronous & Synchronous Mix *
- Viewing Period **
- Additional Clips

0. Redesigning for Online Learning

LINKING SEPARATE WORLDS

VISUAL RADIO

1. Radio Host Spirit
2. Asynchronous Interaction
3. Operation Team

DRAWING STUDENTS INTO THE CLASSROOM ATMOSPHERE

4. Inviting Opening
5. Sharing Excitement
6. Exemplary Reactors

FEELING EACH OTHER'S PRESENCE

7. Encouraging Cameras On
8. Written Voices
9. Priming Water for Chat Flow

INTERACTION BETWEEN STUDENTS

10. Casual Discussion
11. Conversation Starter
12. Familiar Members

CREATING A NEW FORM OF LEARNING

MAKING THE MOST OF SEPARATED ENVIRONMENTS

13. Discovering in Proximity
14. Close Reality from Afar
15. Benefits of Anonymity

DESIGNING LEARNING THROUGH THE INFOSPERE

16. Creator's Point of View
17. Parallel Rooms
18. Others' Thoughts

DEVELOPING A WHOLE FROM PARTS

19. From Small Groups
20. By Students for Students
21. Weaving Discoveries

BEYOND THE TIMETABLE

22. Asynchronous & Synchronous Mix
23. Viewing Period
24. Additional Clips

BUILDING A SENSE OF BELONGING

CREATING A COMFORTABLE PLACE TOGETHER

25. Even the Slightest
26. Frequently Incorporating Voices
27. Class Designers

SUPPORTING STUDENTS' CONNECTIONS

28. Chit-Chat Closing
29. Platform for Connection
30. Small Comfort Zone

CREATING A MEMORABLE SENSE OF UNITY

31. Festive Mode
32. Something Special
33. Capturing Lively Moments

VIRTUAL SENSE OF BELONGING

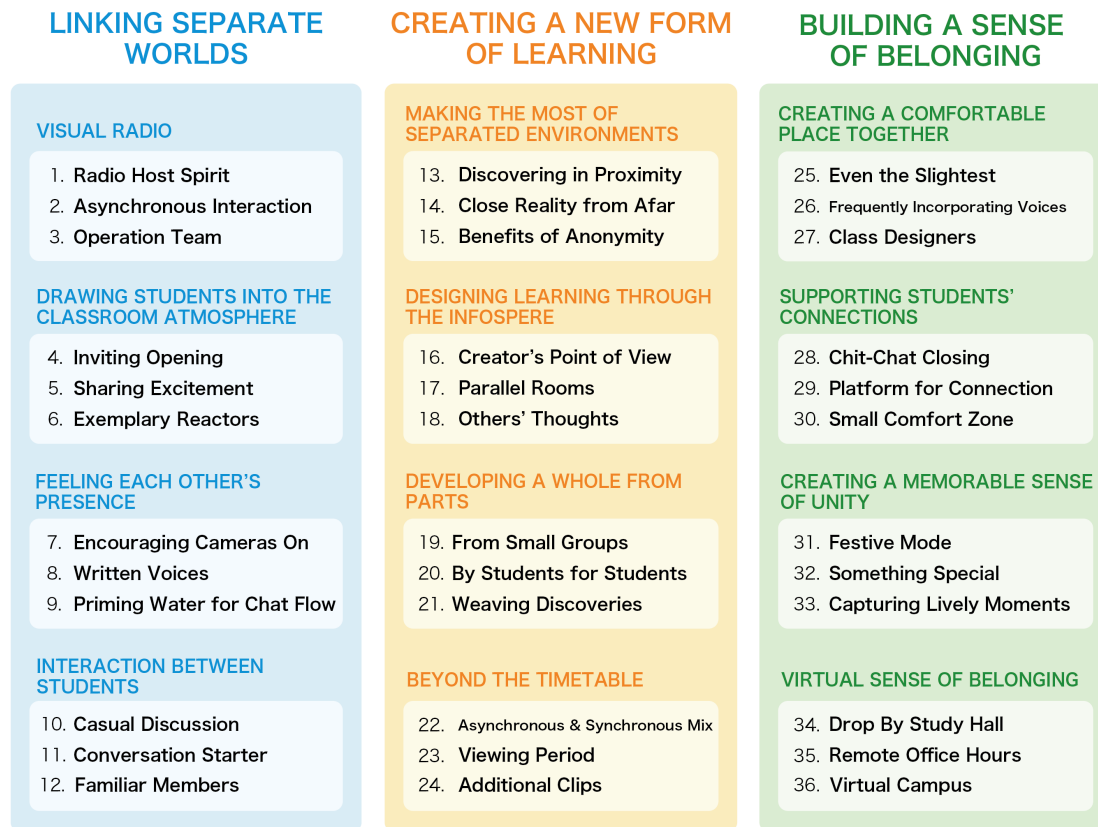34. Drop By Study Hall
35. Remote Office Hours
36. Virtual Campus

Fig. 1. Structure and Pattern Names of the Pattern Language

4. PATTERNS FOR CREATING A NEW FORM OF LEARNING

When conducting an online class, many teachers are concerned about all the things that are lost compared to an in-person class. However, there are things that are difficult or impossible to do in a real classroom but are easy to do online. Online education can be an opportunity for *CREATING A NEW FORM OF LEARNING*.

First, it is important to make good use of a situation that all the students are participating in a different location, thus MAKING THE MOST OF SEPARATE ENVIRONMENTS. For example, *Discovering in Proximity*, which is to have students observe what is around them at the locations where they are taking classes, would bring them new insights. Having guest speakers show and tell the locations they are in will be an opportunity to feel the *Close Reality from Afar*. Taking advantage of the *Benefits of Anonymity* would allow for exploration of a new method of communication.

In an online class, all the students use computers and tablets to participate in the class, so DESIGNING LEARNING THROUGH THE INFOSPHERE is possible. For example, sharing camera images or application screens to show students how to draw pictures and diagrams, delivers the *Creator's Point of View*. In addition, using *Parallel Rooms* by taking advantage of the online system to easily create many breakout rooms, provides all students the opportunity to present their work. In addition, by using a communication platform where all students participate, they can read *Others' Thoughts*, which will lead to discoveries that they could not have made on their own.

To create learning for the class as a whole, weave discoveries by DEVELOPING A WHOLE FROM PARTS. When many students are hesitant to speak up in a class discussion, start the discussion *From Small Groups*. Have

students create learning materials *By Students for Students* individually or in small groups, and then take up the materials and start discussions on them. In addition, the discoveries made by each individual or group can be used for *Weaving Discoveries*.

In addition to real-time classes, online classes can also include on-demand videos that can go BEYOND THE TIMETABLE. A flipped classroom can be realized by *Asynchronous & Synchronous Mix*, where parts of the lecture are videoed on-demand and discussions are held in real time. When delivering on-demand, lecture videos, it would be a good idea to set a *Viewing Period*, such as "watch by this date and submit the assignment." Also, it is a good idea to deliver *Additional Clips* as extra content to provide related knowledge according to students' understanding level and interests.

As mentioned above, *CREATING A NEW FORM OF LEARNING* can be realized by practicing the 12 patterns, which are *Discovering in Proximity*, *Close Reality from Afar*, *Benefits of Anonymity*, *Creator's Point of View*, *Parallel Rooms*, *Others' Thoughts*, *From Small Groups*, *By Students for Students*, *Weaving Discoveries*, *Asynchronous & Synchronous Mix*, *Viewing Period*, and *Additional Clips*.

4.1   Discovering in Proximity

Making the Most of Separated Environments
No. 13

Discovering in Proximity

Making your surrounding environment a learning field.

Each student is taking class from a remote location.

▼ In this context

Because it is not possible to look at or distribute the same things in person, it is not possible to provide the same environment for every student. Learning methods such as doing fieldwork or making observations together can only be done when there is a place for students to gather and share. On the other hand, in an online class, each student is in a different location, and there are differences in the environment and the things around them. Trying to create a uniform experience in this situation and replacing it with a digital one, such as videos, the lively experience may be lost.

▼ Therefore

Have each student look at where they are and what is around them, and bring to the class whatever they discover or find there. It is not necessary for all students to see one same thing in order to learn. Each student can make use of the things and environment of where they currently are and share their findings with each other. For example, decide on a theme and have everyone show and tell each other's findings by observing things around them or in their homes. It is also a good idea to go outside and do fieldwork in your neighborhood.

▼ Consequently

Even though they are connected remotely, students will be able to use their own locations for observation and fieldwork. When each student brings something of their own to show, it is interesting to see the individuality that emerges from the differences in their surroundings, the different things they find, and the different points of view they have of looking at things. In addition, by observing familiar objects and the environment anew, they may discover something new, such as noticing a different way of looking at something that was there before but never noticed.

4.2   Close Reality from Afar
Making the Most of Separated Environments
No. 14

Close Reality from Afar

There is a reality that can only be conveyed by being "there."

You and the guest speaker(s) are participating from remote locations.

▼ In this context

Some students may feel disappointment that one of the appeals of having classes in the classroom, the experience of meeting and listening to guest speakers in person, is not available online. In a real classroom, listening to a talk while sharing the same space with them itself functioned as an "experience" that went beyond receiving information. However, when students are connected remotely, even though they can listen to the person talking, they can't shake the feeling that they are behind a screen, and they may often feel somewhat inadequate.

▼ Therefore

By having the teacher and guest speakers show and tell the area and surroundings from where they are now, make students able to feel the reality of the place. Take advantage of the online situation of being able to connect from anywhere and let them show what is going on at the place where they are right now in real time. For example, field reports, live broadcasts, virtual tours, etc., will give a vivid picture of the local atmosphere and current situation. Since it is easier to invite guest speakers from overseas or remote areas online, it is a good idea to invite people who are difficult to get to come to the classroom.

▼ Consequently

By having students listen to people in remote places in real time and see what it is like there, they can feel a sense of reality that is different from talking in-person class. Showing in a way that is unique to online, such as having the guest speakers interact with their family and neighbors, will be a new and valuable experience for students that is different from classroom learning.

4.3   Benefits of Anonymity

Making the Most of Separated Environments
No. 15

Benefits of Anonymity

What can we do with "anonymity?"

You are trying to figure out how to gather opinions and communicate with each other.

▼ In this context

Simply replacing classroom interactions with ones online is not enough to take full advantage of information technology communication methods. Communication in a face-to-face environment means that it is always clear who has said what. In such a situation, people may become conscious of other people's eyes and thus end up speaking less, which may prevent them from having discussions that could have been more developed and new ideas that could have been born from them.

▼ Therefore

By introducing a mechanism that allows students to write anonymously, create a communication situation that would be difficult to achieve in a real classroom. For example, voting anonymously not only

makes it easier to answer questions honestly, but also allows people to know where they stand without revealing where they voted. It's also a good idea to have students write Written Voices anonymously. One teacher has developed a class where students do group work for a whole semester without revealing their names or faces to each other, just using their made-up usernames to communicate. With a username, only the teacher can know the link to the real name in case of emergencies or for grading purposes.

<div align="center">▼Consequently</div>

By removing the filter of "who" and drawing out statements that are separate from the individual, it becomes an opportunity to create new forms of self-expression and communication. By practicing anonymous communication in the classroom, it is possible to create an active place where students can write their honest feelings, reactions, and impressions. In this way, taking advantage of the fact that everyone is far away from each other and cannot see each other's' faces will make online classes more interesting.

4.4   Creating on the Spot

Designing Learning Through the Infosphere
No. 16

Creator's Point of View

<div align="center">Simulating the experience of the creator as if your own hands are moving.</div>

You are trying to illustrate and explain something, how to draw a picture, or how to create crafts.

<div align="center">▼In this context</div>

Simply showing and explaining a finished drawing or piece of work does not allow students to know the details of how it was created. The more well-made it is, the harder it is to imagine the process when they only see the finished product. If students do not know the order in which things are made, what is thought in each of the steps, and what trial and error it encounters, they will not know how to make them when they try to create them by themselves.

<div align="center">▼Therefore</div>

Share the process of creating something on the computer or by hand in real time, so that students can experience the process from the same perspective as the creator. When working on a computer, share the screen, and when drawing a picture, show the hands on camera to show the actual process of creation. By using a laptop with a camera, the view at hand can be easily shown by simply tipping the screen forward. Furthermore, it is possible to show the process from a perspective closer to the creator by using a smartphone holder to capture the view from above. The sound of creating the work can also be delivered, so that the students can feel as if they are watching it from nearby.

<div align="center">▼Consequently</div>

By showing students how to create a piece of work, they can get a clear sense of the creation process. In this way, the students can not only gain a better understanding of what is being created, but also learn how to operate the computer and use the tools at the same time. Rather than watching a demonstration on a screen from a distance in a real classroom, watching it on their own computers or tablet screens will make them feel as if it is happening right in front of their eyes, and it will be a simulated experience as if they are making it themselves.

4.5   Parallel Rooms

Designing Learning Through the Infosphere

Parallel Rooms

Have multiple presentations at the same time.

You are trying to create a place for students to make presentation.

▼ In this context

There are times when the time available for presentation is too short, and only the representative of the group has time to present, or the part that each person is responsible for is extremely small. There is a time for class is limited, and if a lot of time is spent on explaining what needs to be taught, it becomes difficult to take enough time for students to share their learning and reflect on it. In this case, students may not have enough opportunities to output what they have learned in class, and the semester may be over before they realize it.

▼ Therefore

By dividing students into several rooms and allowing them to have presentations in each room, ensure that all students have ample opportunity to present. In an online environment, it is possible to make as many breakout rooms as needed and move the students in a second. Utilize the situation and assign one or several presenters and some audience to each breakout room. It is also a good idea to record what is going on in each room, or take time to share what was said in each of the rooms when the whole class gathers after the presentation, so that everyone that were unable to attend can learn what was presented in the rooms.

▼ Consequently

Each student will have more than enough opportunity to present and reflect on what they have learned through the class. Since there are fewer people in one room, the presenters can relax more, and the listeners can ask questions more easily. Furthermore, if the students can move freely around the breakout room, they may be able to see many people's presentations bit by bit and enjoy them more.

4.6   Others' Thoughts

Designing Learning Through the Infosphere
No. 18

Others' Thoughts

When you see from a different perspective, you will discover something new.

You are having students submit their feedback to the class or some works.

▼ In this context

If students only submit their feedback or works to the teacher, they will only be able to think from their personal perspective or the teacher's and miss out on the opportunity to make new discoveries. In an online class, students participate in the class from a distance, but they are not taking the class alone. Each person perceives the class in a different way, and sharing this information may lead to new discoveries. If they only show

their submissions to the teacher, they will not be able to fully utilize the environment where they can learn together with other students and be exposed to various ideas.

▼Therefore

Have students freely submit and read each other's reflections on class content or homework so that they can learn from other students' thoughts. For example, use a Platform for Connection for a place to submit submissions and make students able to see what other students taking the same class are writing. In addition, let students freely add comments to the submissions so that they can see what other people are thinking about the works. In this way, create a system that allows the exchange of opinions utilizing information technology.

▼Consequently

By reading the comments of other students, students will be able to see things from a new perspective that they would not have noticed on their own. Even if they are taking the same class, knowing that there are people who think differently than they do, or that different people assess their submissions differently, will become a chance to realize that they cannot receive if they are learning alone. Even though the members of the class are far away from each other, they become friends who inspire and improve each other.

4.7   From Small Groups

Developing a Whole from Parts
No. 19

From Small Groups

Stage steps to weave together the findings.

You would like to discuss a topic with the whole class.

▼In this context

When students are asked to speak in front of the class, there is often a psychological hurdle that makes them hesitant to do so. Especially when there is a large group of students who are of a higher grade or level than them, they may feel anxious about whether what they say is right or worth saying. However, this may result in the situation where only fixed members speak, and the topics and opinions may be biased. Also, if the discussion progresses with only a few people talking about advanced topics, inexperienced members or members in lower grades will be more reluctant to speak up and will become more passive.

▼Therefore

Before the whole discussion, break the discussion into small groups so that students can easily share their opinions and impressions. Start at a small scale of about three to five students and ask them to share their findings. It is also a good idea to form groups with people of similar levels, such as by grade. Later, in a plenary session, ask some of the group members to share what they talked about, or ask the person who made the comment to talk about it to deepen the discussion. Depending on the number of people and the content of the discussion, it may be better to increase the number of steps by inserting a medium-sized group between the small group and the whole discussion.

▼Consequently

By starting at a scale where it is easy to speak up and then increasing the number of people, opinions and ideas will naturally be absorbed, and a variety of voices will come up in the discussion across the whole class. In

addition, the opinions and ideas will become confident through empathy and appreciation in a small group, so the students become more eager to talk about them in front of the class. In this way, discoveries are woven through sharing each student's ideas, and gradually increasing the scale and sophistication of discussion will lead to greater discoveries for all the class.

4.8   By Students for Students

Developing a Whole from Parts
No. 20

By Students for Students

Learning by creating and learning from what you have created.

▼In this context

In a class where the important elements students are to learn about are all prepared in advance and explained, there will be less opportunity for students to think and discover on their own. Surely, it would be more time efficient and easier for students to understand if the teacher summarizes the class content in advance. This is especially true for online classes, which often take a lecture format in consideration of technical problems. However, the process of trial and error and the discoveries that occur during the process of creating something can be a great learning experience for students. Only conducting lecture-style classes may take away important those learning opportunities.

▼Therefore

By using what the students create in the class as materials for learning, work together with them to create discoveries in the class. Creating is not just about outputting what they already know, but it is about making new discoveries and deepening their learning through these discoveries. For example, students can make their own textbook about what they want to learn more about. Some instructors offer classes in which students plan and run workshops as group work, and by experiencing them as participants, they can deepen their learning by reflecting on the workshop together. In this way, by using and discussing what the students have created in class, make it possible for students to deepen their knowledge and understanding, and get a learning experience with the class as a whole.

▼Consequently

Students can learn not only from the materials given to them, but also by creating their own learning materials. Deepening their knowledge and understanding through the creation of their own "textbooks" is a different experience from simply learning from already existing materials. In some cases, they may notice the difficulty in the process of creating and experiementing. This kind of learning may be easier to do in an online environment where it is easy to display and share what students have created than in a real classroom.

4.9   Snowball Effect

Developing a Whole from Parts
No. 21

Weaving Discoveries

Build individual insights together to create discoveries as a whole.

Students are working on individual or group research.

▼In this context

Only letting the discoveries made during individual or group research shared among only those students, an opportunity for creating further insights may be lost. During research, each individual or group makes new discoveries or achieves results. However, as it is, the experience will be skewed to a few students and the others will not be able to experience the discovery. In this way, new insights and results that would have been generated if the discoveries had been shared would not be born.

▼Therefore

By having students bring their own insights and discoveries and weave together what they have created on the spot, lead them to greater discoveries as a whole. First, ask students to explore the major themes of the class through individual and group work, and then have them report back to the whole class on the discoveries they have made. By adding functions like *Written Voices*, add meaning and develop further discoveries. In this way, experience the creation of discoveries together as a whole class.

▼Consequently

Discoveries made by diving deep individually or in small groups will be opened to the whole class, and when combined, they would turn into something new and bigger. In addition, since each discovery becomes part of the finished outcome of the class, it is easier for students to feel that have contributed to the learning of the class, and they will have a sense of accomplishment. Furthermore, by creating a single discovery with the entire class, a sense of camaraderie will be created among students who have experienced the same thing.

4.10 Asynchronous and Synchronous Mix

Beyond the Timetable
No. 22

Asynchronous & Synchronous Mix

A new type of class with asynchronous learning.

You are considering what style of class to choose.

▼In this context

Thinking of choosing a class style as a dichotomy between the asynchronous format and the synchronous format, it will only be possible to take advantage of one of them. Online classes have created a new option of asynchronous class that was not available in real classrooms. This allows students to learn without being restricted by time constraints, but on the other hand, multi-vocal exchanges such as discussions and question-and-answer sessions can only be done in a live, synchronous format. Both asynchronous and synchronous formats have their advantages and disadvantages, and taking one means giving up the other.

▼Therefore

Use both asynchronous and synchronous styles, such as having students watch the lecture portions with on-demand, recorded video and attend live, real-time class for opportunities to exchange questions. For example, the lecture part that can be viewed alone can be recorded and made available for students to watch in advance. On-demand video allows students to watch at their own pace, at any time and place, and to repeat difficult or important parts. The class time can then be conducted in a live format, focusing on interactive learning

that can only be achieved by coming together at the same time for discussions, question and answer sessions, etc.

▼Consequently

By taking advantage of the strong points of both the asynchronous and synchronous formats, "flipped classroom" can be realized, allowing students to use their time more meaningfully and deepen their learning. In addition, the reversal of lectures and group work makes students able to gather and work on groups in a coherent amount of time, and also allows teachers and assistants to be present during group work to provide consultation and advice. This will be a good help to improve the quality of the outcomes. In this way, rather than choosing one format as "the right format" for a certain class, considering and combining formats for each content of the class expands the possibilities of online classes.

4.11 Assignment Checkpoints

Beyond the Timetable
No. 23

Viewing Period

Set a deadline for viewing."

The students were asked to watch video on-demand.

▼In this context

When videos are available at any time, students tend to put it off and accumulate it. On-demand videos have the advantage of allowing students to watch at their own convenience, without being restricted by time. However, if there is too much freedom, watching the video "now" will inevitably become a low priority compared to other things that need to be done or want to be done. If such a situation persists, it may become hard for students to watch them all at once later, and the learning effect may diminish, or they may end up not watching them at all.

▼Therefore

Encourage students to watch the videos without accumulating them by setting a time period in which they can watch or setting deadlines for the assignments associated with the videos. For example, if weekly classes are recorded and held on demand, set weekly deadlines for assignments that require students to write their impressions of the videos and their understanding of the content.

▼Consequently

By having regular deadlines, students will be able to watch the videos without accumulating them. In addition, if students submit assignments, it will be possible to check their level of understanding in each class and realize *Asynchronous Interaction*, and support learning according to each student's understanding and improve the class as needed. Even in on-demand classes, it is important to assist students with the basic system so that they can learn well.

4.12 Additional Clips

Beyond the Timetable
No. 24

Additional Clips

Go beyond learning in timetable.

There are some contents related to the class that can be introduced to students for further learning.

▼In this context

In addition to the main content of the class, it is difficult to teach the details and related information together in a limited amount of class time. When teaching the class, some students may become interested in the class content and want to know more about the applied content. On the other hand, there may be students who want to review the basics again to properly understand the explanations. While meeting the individual needs of such students is desirable, including these contents in the class time may end up with a class that is too packed and difficult to understand.

▼Therefore

Prepare on-demand videos that can be viewed in addition to the class and allow students to further their learning according to their individual levels and interests. For example, share follow-up videos to the content covered in class, or recordings of background knowledge and applied content that cannot be fully explained in class time. These videos are not necessarily required to be viewed by everyone, but can be determined by the students themselves according to their needs and interests. It is also a good idea to give recommendations together, such as who should watch this video.

▼Consequently

Using on-demand video, it is possible to provide more advanced or follow-up content according to the students' interests and level of understanding. Students will be able to deepen their knowledge of what they are missing or want to know more about, which will lead to higher quality learning. Also, some students may find the content of the class deeply interesting by watching videos that deal with applied content which are not covered in their regular classes. In this way, on-demand video can also be used to provide learning that is really "on demand."

5. STUDENT RESPONSES AND EXAMPLES OF PATTERNS

One of the authors of this paper, Professor Iba, practiced what is described in the patterns above in his university classes from 2020 to 2021. He had his students take an anonymous survey on which patterns they thought were used in the class and how they felt about them. In the following, the practices and the students' responses are described.

5.1 Discovering in Proximity

In Prof. Iba's class, he asked the students to introduce each other's "favorite things" in the house during their self-introduction, which was very lively and well received.
- When students introduced their own favorite things in their homes, it was interesting to see what each person focused on in their homes. I introduced stuffed animals, and it was nice to be able to introduce something that I don't usually show at school.

Another professor felt that it would be more interesting to give the students a task that would require them to look more closely at the city and the region than they normally would, so he decided to ask the students to choose one thing in or around their house and spend three months (during the spring semester) observing it in a unique way that only they could do, and to create an "observation guide".

5.2 Close Reality from Afar

In Prof. Iba's class, he invited guest speakers from not only Japan, such as Kobe, Kumamoto and Shimane, but also from abroad, such as Italy, the U.S. and Germany, to talk about the local situation. There was also a guest speaker who gave a farm tour in real time to show the reality of agriculture.

- Throughout this class, I felt that the advantages of online were really apparent. I felt that I could enjoy the differences in clothing, language intonation, and background reflections in different places. I felt that I could feel the atmosphere of the place in the class, which is possible only when the guest speaker or speakers are there, and this is something that can only be done online.
- The most memorable thing was that a teacher from the U.S. came to the class connecting zoom from her home abroad. I couldn't understand English well, but I could tell from the background that the place was different from Japan, and I was fascinated by it. I found that there is information that can be shared even if you don't understand the language.

5.3   Benefits of Anonymity

Taking advantage of the online features that allow for complete anonymity, there was a teacher who provided a unique class using handle names and complete anonymity, a method of communication without identifying the individual. In his lectures, he used a web application that allowed students to ask questions without disclosing their names, and he accepted questions and comments from students completely anonymously. In addition, communication with other students and teachers during group work and outside of class was done by using a different communication space called "Beta-mura" with a handle set by each student. Some groups did not even use their own names for group work, and carried it out in a completely anonymous environment. One of the authors (Kiyoka Hayashi) took this class, and here is what she felt about this class.

- By communicating anonymously, I didn't have to worry about whether I could say this, and it was very easy to express my opinions. I also liked that each student had a handle. This allowed me to take responsibility for being a member of the class and a member of the group work, and I could make responsible comments. In addition, this class had more communication among students and between students and teachers outside of class than any other class I have ever taken. I feel that this is because we don't know each other's face, gender, or grade, which makes us want to know more about the people and talk to them. And since we were doing it as if we were tweeting on social media, such as "I'm tired" or "You have a lot of assignments," I could feel the human side of the other students, which made the class feel more comfortable.

5.4   Creator's Point of View

In Prof. Iba's class, "Pattern Language," he explained the points and tips to keep in mind when drawing, while sharing in real time how he was drawing Pattern Illustrations. He showed how his hands actually move when he drew an illustration, such as how he drew thinly with a pencil at first to grasp the whole picture, and how he erased and redrew many times.

- Since I could see his work very clearly, I was able to see him painting very closely, which was very exciting and great.
- When the teacher was explaining the Pattern Illustration, I felt as if I were drawing it myself. And by seeing this in front of me, I was able to get a better sense of what our illustrations should be.
- When explaining about illustration, in addition to using PowerPoints and verbal explanations, the teacher practiced delivering the Creator's Point of View, which made it easier for us to get an image of how to draw illustrations when we actually think about it.

5.5   Parallel Rooms

In the conference for the Iba's laboratory, several project teams working in that laboratory each had their own room, and four projects presented their research at the same time. While presenting on the same theme, he tried to include some slightly different perspectives and contents in each slot, so that all project members would be able to present in some slot. In this way, he took advantage of the online feature of being able to easily create multiple breakout rooms and designed it so that all members would be presenters. In addition, the room was set up in such a way that the listeners could freely enter and exit the room they wanted to see, giving them a degree of freedom.

- I think it was good that each of us had the experience of preparing to present our projects well. Preparing for the presentation was a good opportunity to reflect on the project. I also think that the participants enjoyed going around.

- I really liked the way that each project presented their work in three slots. It was great that each project could present their research from different perspectives. It is also good that the audience can enjoy the presentation in different ways, such as stopping at the same project or going around to different ones.

5.6   Others' Thoughts

In Prof. Iba's class, a communication platform (Slack) was used in which all students participated. He asked the students to post their reflections on the class and literature assignments on the platform, so that the students could see and learn from other students' thoughts.

- It was great to have a place where we could share our reflections on each class and our impressions of the books on slack and open up our thoughts to each other. There were many interesting comments such as "I didn't know there was such a way of thinking" or "This person's comment sounds really interesting", and I couldn't help but react to them. When I wanted to know more or learn more outside of class, I was happy that I could easily make new discoveries through Slack.
- In the class, we were so focused on the work that it was difficult to know what the group members were thinking. That's why I found it very effective to be able to read other people's thoughts, and to be able to connect with them in terms of feelings. In addition, it is difficult to see the status of other groups and students when working in the same group all the time online, but I feel that the Others' Thoughts solved this problem. Being able to see Others' Thoughts helped me to maintain my own motivation for the class.
- By being able to share my thoughts on slack, I was able to update my own learning based on what others felt, and I was able to verbalize what I did not understand, which made it much more meaningful than a self-contained reflection. In addition, from the fact that I was able to learn this way by reading the reflections of other students meant that my reflections were also learning for someone else, I was able to maintain my motivation feeling the significance of reflection and not just an assignment for credit.

5.7   From Small Groups

In Prof. Iba's laboratory, when discussing group reading or a certain topic, he would first discuss it in groups of three or four people and then discuss it with the whole group, or after the discussion in groups of three or four people, he would set aside a time for discussion in a medium-sized group and then have them share it with the whole group. In this way, the discussions were carried out in two or three stages, so that opinions and ideas could be naturally shared and incorporated with the whole group.

- I enjoyed exchanging opinions From Small Groups, which allowed me to talk to people I don't usually talk to. In a small group, I felt like I had to say something, so I started to speak up more.
- When I express my thoughts to the class, I often feel anxious about whether my thoughts are something just I feel, or whether other people feel the same way. However, by starting the discussion From Small Groups, I could ask my group members how they feel about my opinion, which helps me deepen my own thinking, and it's very interesting to see how a discussion can expand from a single idea.
- By discussing From *Small Groups*, I could see the reactions of the people around me to my opinions.When I suddenly had to speak in front of a large group of people, I was anxious about how they would react. However when the discussion started From Small Groups, my anxiety was reduced and I was able to share my opinions actively. By doing so, I was not only able to increase the amount of my remarks, but also find new discoveries in small group discussions, which led me to be able to contribute more than usual by sharing them with the class.

5.8   By Students for Students

In Prof. Iba's class, "Pattern Language," he picked up some of the patterns that students had written in group work and gave comments and revisions to them, so that students who were writing other patterns could learn from them how to express and write patterns, and reflect them in their own creations.

- I thought it was a great idea to pick up several patterns written by the group team during the pattern making process and improve them together with the whole class. I also found it helpful to read the teacher's revisions in red for the other groups.
- After the group work time was over, the teacher took questions from the whole group and gave advice, which was very helpful in creating patterns. By seeing the teacher giving advice to other groups on what

they were actually having trouble with in their patterns, we were able to learn a lot and figure out what we should do with our own patterns.

Also, in Prof. Iba's class, "Workshop Design," the importance was not on the quality of the workshop, but on the learning in the process of creating and experiencing what other students had created. The class was designed to deepen the knowledge and understanding of workshop design by having all the students experience the workshops each group had created in group work, and discussing the design intentions through reflection and feedback.

5.9   Weaving Discoveries

In Prof. Iba's laboratory, when we did a group reading, we started the discussion From Small Group and did Weaving Discoveries. What was discussed in each group was shared with the class, and the students commented on it and created new perceptions.

- I really felt this pattern was incorporated in this class. Since I brought something that I had thought deeply about, rather than just reporting that I had talked about , I had strong feelings about it already. And I remember that I really felt like I was part of the learning process, not just listening to it, and I really enjoyed the way my thoughts expanded from there.I also felt that the creations were filling me up.
- When we discussed a book in class, we started with a breakout session to discuss the book and then shared the discussion with the whole group. At that time, it often happened that the teacher or students would add knowledge and experience that our group did not know to the ideas that had been shaped through the discussion, and develop them into newer ideas. What I felt at that time was surprise that the ideas discussed in the group were still growing. It was a little different from the feeling of new ideas coming out of other groups. It was the first time I felt the overlap between the breakout discussions and the discussions of the whole class.

5.10   Asynchronous & Synchronous Mix

In Prof. Iba's class, "Pattern Language," a flipped classroom approach was implemented, using both on-demand and live-class teaching. In order to deepen the understanding of pattern language, such as the history of pattern language and cases of its use, he asked the students to watch the on-demand video before the class, so that the class time, when all the students could gather, could be a time for discussion and group work.

- I was impressed that the teacher said in the first class that the class time would basically be spent on group work. The lectures were given on-demand, so I could learn at my own pace and repeat what I didn't understand. In addition, the class time was spent on group work, which allowed us to take our time each week to create and revise patterns. This was a new experience for me because in other online classes, we usually do things either on demand or in real time, but this approach made me feel that I was spending my time in a very meaningful way.
- The style of having assignments before class was   very good for me. By understanding the main points of the class on demand beforehand, it was easier to understand what the professor was saying, and I was able to continue taking the class without getting bored because there was less time for just inputting lecture style. I was also very happy that we were able to have a longer group work time in class, as it was difficult to arrange a time for group work because of our busy schedules. By doing group work in the class, we were able to enhance the quality of the patterns by being able to ask questions each time without having to interpret the questions that came up during the discussion in our own way.
- It was a great combination of the good points of on-demand where you can watch anytime and the good points of live where you can interact. By having group work time during class time, I was able to immediately ask questions to the teacher, a Teacher Assistant, Students Assistants, and guest lecturers who worked together to create the pattern language. If we had done group work alone outside of class time, I think we would have left the questions unanswered and we would have faced a situation where we would not know what we did not understand in the next class.

5.11   Viewing Period

In Prof. Iba's class, he set assignments for the on-demand videos shared in the Asynchronous & Synchronous Mix class , so that students would not put off watching the videos, accumulate them, or not watch them until the end.

For the assignments, the students were asked to submit their reflections on what they felt and thought after watching the on-demand videos by the designated deadline.

- I'm thankful that I was able to watch it before the next class without being lazy because it was given as an assignment.
- Since each assignment had a deadline, I was able to work on the assignments in a planned way without accumulating them, and I think I was able to steadily gain knowledge and experience.

In addition to classes that set deadlines for assignments to on-demand videos, there were also classes that limited the period of time that students could view on-demand videos.

5.12 Additional Clips

In Prof. Iba's class, he recorded a video of the preparation for the class with a class assistant before the class, and shared the video so that anyone who wanted to see it could watch it. In the "Pattern Language" class, he shared the 5 hours of systematization with the students so that anyone who was interested in how the systematization was done could watch it. The video was not required to be viewed, but he told the students that it would help them understand the content better in their group work and encouraged them to watch it.

- I had to watch Additional Clips because I didn't understand the relationship between the patterns before and after the one I was writing, but I didn't feel weighed down by the option of not watching. On the other hand, the more I watched, the more I was able to grasp the whole picture of this pattern language, and I thought it was a great opportunity for those who are interested in the process of pattern creation to see senior students of Iba Lab and the professor Iba seriously working on it.
- Additional Clips helped me understand how much time the teachers, Student Assistants and a Teacher Assistant were able to devote to the class, improve the quality of the class and get closer to the students. By watching the videos about systematization, I was able to understand how the key elements came together. I feel more excited about the class itself because I learned more about the process of pattern language.
- After seeing the key elements created by the teachers, I was interested in how they created the key elements, so I watched the video. I saw that the teacher and his assistants had spent a lot of time discussing each of the key elements, which made me motivated to do my best in the group work.

6. CONCLUSION

In this paper, the 12 patterns in the CREATING A NEW FORM OF LEARNING category from Online Education Patterns were presented. The patterns in this category are focused on becoming creative with and highlighting the features of online learning. Together with the core pattern and 24 patterns in the first and third category, this pattern language provides an overall picture of creating great online learning and helps teachers to realize it.

A variety of pattern languages in the field of education have been created, such as Pedagogical Patterns by Bergin et al. [8], "Lecture Design Patterns" [9], "Dialogical Assessment Patterns for Learning from Others" [10], "Active Learning Patterns for Teachers" [11], and "Creative Education Patterns" [12]. Although these languages were probably created with in-person classes in mind, there are many patterns that can be effective in the context of online classes. There are also patterns for e-learning, such as "What Learners Teach Us: E-Learning Patterns for Adult ICT Education" [13], which can be used for online learning as well. We believe that the pattern languages above and the pattern language shown in this paper can be used together for creating classes in the new online age.

This paper is part 2 of the Online Education Patterns series. Patterns for LINKING SEPARATE WORLDS, which helps overcome the challenges of being in remote places, are presented in part 1 [3]. Part 3 will introduce patterns for BUILDING A SENSE OF BELONGING, which helps create a sense of belonging for students that schools as a place provided also online.

Educators are always aiming for the betterment of learning of students, thus, are constantly finding ways to provide the best learning and learning environment. Education has endless possibilities and can take many different forms. With the remaining 12 patterns presented in the future, we hope that many teachers will make use of the patterns in their educational practices and realize great online classes. We also hope that online learning will continue to become one option of form of education.

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APPENDIX

The following is a table with short descriptions for each of the patterns in Online Education Patterns.

Core Pattern

Group	No.	Pattern Name	Short Description

Core	0	Redesigning for Online Learning	Think about how the targeted learning can be realized in an online environment and recreate the class by adding innovations that are unique to online.

LINKING SEPARATE WORLDS

Group	No.	Pattern Name	Short Description
Visual Radio	1	Radio Host Spirit	Imagine being a radio host and talk to the students like how radio hosts deliver messages to the distant listeners.
	2	Asynchronous Interaction	Ask students to write down their thoughts and impressions after class and adopt them in creating the class.
	3	Operation Team	Assemble a team of a few people to run the class and share the necessary roles.
Drawing into the Classroom Atmosphere	4	Inviting Opening	At the beginning of the class, prepare an inviting segment that draws students into the class atmosphere.
	5	Sharing Excitement	Remember and feel what makes the lecture interesting and captivate the students with engaging talk.
	6	Reaction Members	Ask some students to attend the class with their microphones on so that their reactions can be shared with the whole class, nurturing an open environment.
Feeling Each Other's Presence	7	Encouraging Cameras On	Encourage students to turn their cameras on as much as possible so that the students taking the class can feel each other's presence.
	8	Written Voices	By having the students actively write in the chat, let them share their thoughts, ideas, and questions at any time during the class.
	9	Priming Water for Chat Flow	By having the members of the Operation Team take the lead in writing in the chat, create an atmosphere and flow that facilitates students to also write.
Interaction Between Students	10	Casual Talk Time	Set aside time for students to converse casually with each other, and have them talk about their impressions, thoughts, and questions.
	11	Conversation Starter	Set simple rules that determine the order in which people start talking so that they can strike up conversations naturally.
	12	Same Members	Group students up with the same people each time breakout rooms are used for that day and create a comfortable place for students to talk.

CREATING A NEW FORM OF LEARNING

Group	No.	Pattern Name	Short Description
Making the Most of Separated Environments	13	Discovering in Proximity	Have each student look at where they are and what is around them, and bring to the class whatever they discover or find there.
	14	Close Reality from Afar	By having the teacher and guest speakers show and tell the area and surroundings from where they are now, make students able to feel the reality of the place.

	15	Benefits of Anonymity	By introducing a mechanism that allows students to write anonymously, create a communication situation that would be difficult to achieve in a real classroom.
Designing Learning Through the Infosphere	16	Creator's Point of View	Share the process of creating something on the computer or by hand in real time, so that students can experience the process from the same perspective as the creator.
	17	Parallel Rooms	By dividing students into several rooms and allowing them to have presentations in each room, ensure that all students have ample opportunity to present.
	18	Others' Thoughts	Have students freely submit and read each other's reflections on class content or homework so that they can learn from other students' thoughts.
Developing a Whole from Parts	19	From Small Groups	Before the whole discussion, break the discussion into small groups so that students can easily share their opinions and impressions.
	20	By Students for Students	By using what the students create in the class as materials for learning, work together with them to create discoveries in the class.
	21	Weaving Discoveries	By having students bring their own insights and discoveries and weave together what they have created on the spot, lead them to greater discoveries as a whole.
Beyond the Timetable	22	Asynchronous & Synchronous Mix	Use both asynchronous and synchronous styles, such as having students watch the lecture portions with on-demand, recorded video and attend live, real-time class for opportunities to exchange questions.
	23	Viewing Period	Encourage students to watch the videos without accumulating them by setting a time period in which they can watch or setting deadlines for the assignments associated with the videos.
	24	Additional Clips	Prepare on-demand videos that can be viewed in addition to the class and allow students to further their learning according to their individual levels and interests.

BUILDING A SENSE OF BELONGING

Group	No.	Pattern Name	Short Description
Creating a Comfortable Place Together	25	Even the Slightest	Pick up and respond to every comment even if the comment is just a slight one so that people can feel that they have been noticed and part of the class.
	26	Frequently Incorporating Voices	Incorporate feedback from questionnaires and any voices heard during break time and improve the class by enhancing what is good and improving what needs to be improved.
	27	Class Designers	Involve some or all of the students in creating and designing the class, so that they can create their own sense of belonging where they can be themselves.
	28	Chit-Chat Closing	After the class, by dividing the students into small breakout rooms, allow them to dismiss naturally

Supporting Student's Connections			after chit-chatting with other students which create an opportunity for casual interaction.
	29	Platform for Conversation	Using online communication tools, create a space where the teacher and all the students can connect even the outside of the classroom and communicate freely at any time.
	30	Small Comfort Zone	By organizing group work with the same members or forming small teams for ongoing engagement throughout the term, create a space where students can share their small everyday worries and feelings, or any questions with each other.
Creating a Memorable Sense of Unity	31	Festive Mode	Produce a memorable and fun time for students by matching their outfits and virtual background themes to seasonal events such as Christmas and Halloween, or by making the final presentations as an attractive event.
	32	Something Special	Mail something special to each student's house, not something that can be shared online, and enjoy the feeling of togetherness of having the same thing at the same time, even online.
	33	Capturing Lively Moments	Photograph and share moments of excitement and emotional moments when you have achieved something together, so that students can remember the events and feelings of those moments.
Virtual Sense of Belonging	34	Drop By Study Hall	By creating a place where each student can work silently on an assignment or other individual task, provide a place where people can concentrate on their own work while feeling the presence of others who are also working on their own tasks.
	35	Remote Office Hours	Hold regular open spaces where students can come casually, and give the students an opportunity to ask questions, discuss and chit-chat.
	36	Virtual Campus	By creating recreated spaces of school and symbolic places on virtual where students can enjoy events and communication that go beyond the classroom, make them feel like they belong to the school.