The Backward Design in Pedagogy and Its Formative Practices in Japan

ODA Katsumi

日本における逆向き設計カリキュラムとその初期的実践

小　田　勝　己

Abstract

Despite its highly applicable pedagogical values, little attention has been given to the "backward design" in pedagogy. This manuscript will analyze the applicability of the backward design to the classroom practices in the schools in Japan, the problems of adaptability, and the role of the teacher education. Defining the backward design as a methodology to let children acquire the deep understanding through pondering things and the concepts in society, I will also examine the possibilities and the difficulties surrounding the backward design. My research being quite young, this manuscript will present tentative insights into the nature of this pedagogy.

要　約

カリキュラム学における新しい方法としての「逆向き設計」が日本の学校現場に応用的に使われ始めたのは最近のことである。本「研究ノート」においては、逆向き設計の考え方を、その発祥当時にまでさかのぼり、筆者が直接指導を受けたアメリカのマサチューセッツ州のブルックライン学校群での方法を分析し、この方法の持つ利点とそれを日本の学校現場に応用する際の問題点を示す。

本来この方法が志向する「知識の創造」（knowledge-building）は、経営の世界などで、ピータードラッカーなどにより提起されたものである。企業内の多様な見方や知識を束ねることで新しい知識が構成される、というものであった。その過程で時間をたっぷりかけた「熟考」が知識創出のための触媒要素になる。しかし、熟考のための時間を確保できない学校現場では、知識創造のための「熟考」学習の制度化は難しい。

本「研究ノート」は、この方法の合理的な導入のための条件を、ここ2〜3年の研究結果をもとに吟味する。その成果の一部として、現場の教員の方がたが「持続可能社会」をどのように逆向きに設計したかを振り返る。

1．What the "backward design" means and why it is important

In the ordinary sense of the word, "backward" sounds anti-progressive, even negative. There seems to be two commonly held notions regarding something being "backward." One is the "lack" of something and the other is "unconventionality" in doing something. You may say "let us look at the history of a country backward." Under this methodology, you may instruct your students to look at the modern period at first and then go back to the Middle Ages and finally to the ancient period.

The "backward design" in this manuscript belongs to the second category above. Merely looking at things backward may not clarify the essence of the backward design. What matters is the depth of understanding through learning things in the backward way. How does the backward design warrant the depth and why? These questions have been at the core of my research in recent years, and I hope to list up some of the initial findings.

In explaining something new, it is useful to clarify its historical background: how it was born and why it was supported. I think the following three factors have been involved in the formation of the backward design in curriculum design.

(1)　Is the human understanding linear or meandering?
(2)　Does the "scope and sequence" model guarantee deep understanding?
(3)　Are the "things worth understanding deeply" too subjective?

The backward design model was meant as a challenge to the conventional wisdom in pedagogy. What has been challenged was the seeming efficiency and the numerical accountability in the conventional curriculum theory. This challenge was also a challenge to the prevailing models on understanding. Deeply influenced by the science and math education theorists, the curriculum writers have traditionally regarded the bit-by-bit approach to the subject matters as granted. According to this group of theorists, every bit of information existing side by side is to be mastered completely before a learner takes a next step. In this model, the old maxim of the masterly learning still gets hold of the curriculum.

The backward design meant a departure from this old maxim. The theorists in this school of thought were intent on deciding so-called big pictures or the things worth understanding deeply. Why are these big pictures important and how can they be put into pedagogy?

When understood, the structure of the backward design becomes evident in its double features. One is its philosophy that the learners deserve deep learning experiences, which could not be achieved through the efficiency model. In the course of my research, I run into a prominent theorist's comment which contained a similar doubt on the merit of "doing things fast and efficiently." The book, published in 1938, written by Brenda Ueland, titled *If*

You Want to Write was a fierce refutation against the things done quickly.

…those success-driven business men who, in their concern with action and egoistic striving, forget all about love and imagination, and become sooner or later emotionally arthritic and spiritually as calcified and uncreative as mummies. (p.25)

Few people in the world education would believe that their schools should be the incubators of "successful business men." However, as the influential people in education began to say that success in education should be visible numerically, the slow learners began to feel intimidated. There is nothing wrong about being a slow learner; this is one of the reasons why I support the backward design. A slow learner may be a "pondering learner" who can deepen his or her thoughts.

2．How the "Ideas Evolve Organically"(Peter Drucker) and The Backward Design Fit Togeter

It is one of the greatest ironies in education that the time spent on "pondering" is not regarded as the legitimate product of learning; in fact, most of the school teachers and the administrators would regard it otherwise. There were exceptions, of course. The beauty and power of "pondering" was highly valued at The Project Zero researchers (Harvard University) and practitioners. This organization was founded on Nelson Goodman's ideas on artistic creativity. Music, performing arts, and visual arts were the main topics of interests. These subjects are typically process-oriented, and revision process of a piece of an artistic work are valued. The basic tenet of the research activities at the Project Zero, it seems to me, was to see how children (and adults) create things, and how they revise their work. "Time" and process of pondering was regarded as an important element.

The following statement was made by Howard Gardner who was intent on looking at the creative process of children. I think the phrase "productive thinker" tells a lot about pedagogy.

From my perspective, any educational system should have as a primary mission the enhancement of student understanding, within and across the disciplines. As a result of their education, students should secure a better understanding of the physical and biological world, the social world, the world of the arts, the world of self. ……But such understanding will never come about through the piling of facts. It can only emerge if students have the opportunity to tackle authentic problems; to use their skills in plausible settings; to create objects, alone and in cooperation; to receive feedback on their endeavors, and, ultimate-

ly, to become willing, productive thinkers.

(Forward to *Assessing Student Learning, From Grading to Understanding*, edited by David Allen, Teachers College Press, 1998)

Generally speaking, when educators mention "knowledge-building", they are referring to the linear model of knowledge formation where bits of information are placed in the learners' minds in the exact order. The task of the learners is to master them in "from easy to difficult" ladder. In spite of its obvious advantage in assuring accountability, this method left something behind. The deep understanding does not necessarily take place under this linear model.

My research on the plausibility of the backward design started with the process of knowledge-building. A peculiar trait of the pedagogy researchers in Japan is that they tend to use the ideas in the management theory without examining the applicability to education. For example, the pedagogy researchers often tried to use the Plan-Do-Check-Act cycle as if it were relevant and useful to the classroom instructions. In the same fashion, the pedagogy community in Japan showed a remarkable level of interest in the knowledge-building theory.

When it comes to using the knowledge-building theory, we need to understand its background. In the early stage in the 1970s, there was an idea of learning things backward. Human Problem Solving by Newell and Simon (1972) was influential in pedagogy in the 1970s. Learning objectives were established, and then the learners had to follow the path toward understanding the goals. This method was in direct contrast to the "working–forward" model in which the system approach first theorized by Ackoff was obvious.

The problem-solving model of learning began to have a strong hold on the soil of the pedagogy community in Japan. It became popular like the P-D-C-A cycle. The problem-solving became a standard method in the Integrated Learning. Under the well-prepared class instruction, the problem-solving is a wholesome approach to understanding the things around us deeply. However, there has been a relatively small number of successful examples. Why did the problem-solving approach tend to be unsuccessful?

I assume everything is converged into a question; do the P-D-C-A cycle and the problem-solving approach assure the organic formation of understanding and ideas? Holding this research question, I have explored the ways in which "deep understanding" and "knowledge-building" take place hand in hand. In the course of a year, I run into the works of Peter Drucker. He was a noted theorist of corporate management. His works are too numerous to sum up in this manuscript, but there has been an amazing consistency in his ideas. I found it particularly attractive that knowledge evolves organically in an organizational setting of a corporation. Although the ideas of Peter Drucker have mostly been absorbed among the corporate managers in Japan, the organic growth of ideas was what the

educators needed most, at least in terms of the deep understanding.

What is the organic growth of knowledge? What is the organizational setting of a corporation? Why is the knowledge-building important in the classroom setting? Is the classroom setting similar to the corporate setting? Research questions began to increase. In trying to answer these questions, I came to understand the meaning of "setting." In a corporate "setting," people may bring a variety of "resources" to bear. These include highly individual skills of each employee, the assimilated data on the previous product sales, customer information, and so on. Peter Drucker saw innovation as a new combination of existing elements. The knowledge-building is therefore a process of assimilation.

Here, I cannot help asking an inevitable question; How does the format of "ideas grow organically" fit into the landscape of the Backward Design?

3. To Make "Ideas Are Grown Organically" Possible

The beauty of "ideas grow organically" cannot be denied, no matter how the process is time-consuming. In the ordinary classroom instructions in elementary, middle and high school settings, teachers cannot use "too much time" on particular units, topics, or ideas, but the kind of environment needed to foster the "organic formation of ideas" is possible even in the limited time schedule in an ordinary school.

As my research proceeded to the second year, it began to be apparent that the students I taught at a university started showing the signs of "ideas grown organically." I would like to show a couple of written materials of students who were pursuing an individual research project as a presentation exercise. I have been teaching this course for five years by now, and there has been a constant flow of such episodes.
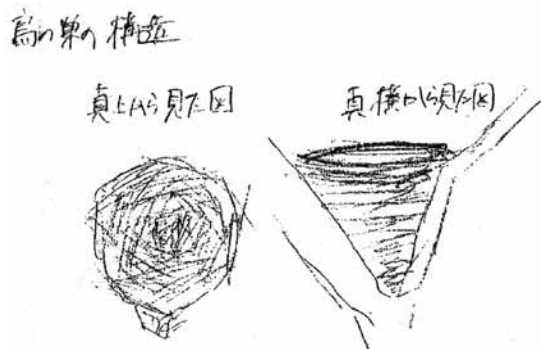
Let me note that the success of this kind of knowledge-building exercise depends upon the structured communications between the students and the teacher, and among the classmates. In the class I teach, I made it clear that following sources of information would be readily available.

(1) teacher feedback in written comments
(2) classroom presentations and discussions
(3) peer comments
(4) library research
(5) interviews with relatives or friends

In the written comments, I often mentioned library sources on technical matters. The students did further research in the library. These feedback notes are given to the students
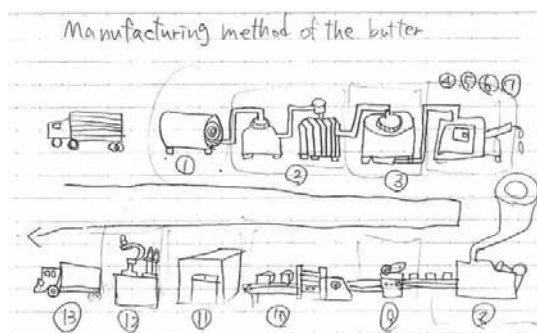
several times during a semester. Here is an example of a drawing on the structure of a bird's nest.

drawing 1

You will notice that this student has developed a remarkable ability of connecting two seemingly unrelated elements. The other example is a drawing on the factory facility of production line of butter. This student, again, shows the expansive understanding between the chemical properties of butter and the mechanical design of the production line.

drawing 2

These two example are representative of a fact among the students; they had no previous experiences in connecting unrelated things into a meaningful conclusion. When ideas grow organically, ideas are first molded, re-examined, compared, seen from backward, and then seen from a distance. Students also learn that the growth of ideas is not a linear process; its is a slow and meandering process including backward reflections.

The beauty of the backward design is, in my view, in its motion in learning. The backward design is an intentional re-alignment of the order of learning. The creators of this model probably kept in mind a picture of a learner who is engaged in learning seemingly unrelated fragments of facts and details on his or her terms. This level of absorption is an-

other name for "motion," and as is often the case of anything that is moving, the learners spend a tremendous amount of time pondering. Therefore, I hope to combine "pondering" and "in motion" as a trade-mark of the backward design.

There seems to be an misunderstanding regarding the word "pondering" as if it were a quite, inactive, retreat from reality. I think "pondering" can be understood as an active use of enough time. Seen from this standpoint, its relevance with the backward design becomes visible, because students engaged in learning in the backward model cannot help spending a fair amount of time, pondering this or that. The backward model is designed to let learners connect seemingly unrelated things. This weaving process is guaranteed when teachers themselves understand the importance of time to ponder.

The difficulty of securing enough time for teachers was recognized in the education community as far back as in the 1980s. There were several outstanding practitioners in those days, and the teacher training played a significant role in specifying he need to use enough time on learning. It was also in the 1980s that the accountability movement began to be visible. This was the beginning of the age of efficiency in education, where most teachers and administrators had no choice but to work under the pressure of accountability. I was able to hold several private interviews with Professor Vito Perrone of Harvard University in the late 1990s.

Professor Perrone valued the role of thinking in education. This was nothing new in education, but the rising pressure of the accountability was beginning to eat out the vigor of those teachers who recognized the need to use enough time on thinking.

Thinking—meaning reflecting, weighing issues and ideas, examining something from many different angles, through a multiplicity of lenses, working through many opinions — takes time. But to the school world of time on task, that kind of thinking doesn't work. (*A Letter to Teachers*, p.23)

The accountability model was essentially a business model. When the teachers were being pushed to this business model, "time to ponder something deeply" became a luxury item, as pointed out in the Philadelphia Teachers' Learning Cooperative's records of meetings. Teachers' Learning Cooperative helps teachers look for a way to work with a diversity of learners, often suggesting that they wait for a year or more to see how a slow learner might develop. We do have the luxury of time to ask and wonder what will happen to a child. This attitude does not mix well with the business model.

It seems to me that the pedagogical community has long seen the "slow learners" from a conventional idea that the children must be pushed toward being "big people" as fast as possible. The progressive educators did great service to improve the formality of doing

things quickly, but even the long-time practitioners of the progressive education sometimes failed to see the importance of pondering certain things with ample amount of time. I should point out that the confusion surrounding the term "fantasy" as opposed to the rational thoughts was at the core of the problem. Even the progressive educators did not make a clear distinction between "fantasy" and "pondering." The slow learners are very often the people who ponder. This distinction was clarified by Tony Kallet, who himself spent school years at a progressive school and had a high esteem of their school ideas, but later noticed that even the teachers at the progressive schools had a tendency to "curb children and impose upon them the limitations of adult fatigue."

What is at stake here is the problem on the part of the teachers. Being driven by the "fast pace," teachers in general are unable to "buy enough time" for children. The teachers themselves are under pressure to do things quickly. Is this an educational poverty? It certainly is, but there has been little academic examinations on the lack of enough time for teachers to ponder; enough time to ponder the things around them, enough time to ponder nature and society. I assume the enough time for teachers to ponder something is an indispensable element in making the backward design successful.

４．The Impact of the Brookline Model

Pondering is at the core of any quality education. What a simple and beautiful way of defining pedagogy! The concept of the backward design was first introduced into the Japanese school community in 2009, but I had an opportunity in 1997 to visit the Brookline Public School systems near Boston, Massachusetts, U.S.A., where the backward design was seriously discussed. The deputy superintendent of schools (Claire Jackson) was an enthusiastic supporter of the school system's emerging pedagogical ideas. In fact, it seemed to me as a refined version of the backward design.

The emphasis no the backward design in the Brookline Public School System was obvious in the following maxim explained to me by the deputy superintendent.

(1)　What You Teach Does Not Mean Students Learn
(2)　What Students Learn Does Not Mean What Students Interpret
(3)　What You Explain Means What You Get

Explaining carried a heavy emphasis in this school district. There was a clear consensus that "the ability to explain" was much broader than "making things plain."　In fact, the

things worth learning mentioned in the Brookline schools are directed toward deep under-standing. Here are several examples.

(1) Explain why the suburbs was such a growth in the 1950s.
(2) Describe the role of television in American life.
(3) Identify new music and art forms developed in the 1950s and the 1960s.

(Social Studies)

(4) Identify the short and long term physiological changes that result from participation in regular physical activity.   (Physical Education)
(5) Explain how a specific problem illustrates a familiar patterns. (Fibonacci Sequence, Pascal's Triangle, or a sequence of a square)   (Mathematics)
(6) Connect own experiences, knowledge, and prior reading to choosing books for fur-ther reading   (Library)

Again, the beauty of the Brookline Model is its structural simplicity and consistency. Although there is no written reference to backward design in the school system's official publications, the concept was defined to me by the deputy-superintendent. The process is step-by-step. First, the things worth learning were chosen, discussed, and evaluated in the faculty meetings. Then, the learning methods such as independent research, library re-search, interviews, and experiments, are chosen. Finally, the assessment methods such as written exams, presentations, and reflective interviews, are chosen. Because of its simplic-ity and consistency, the Brookline Model is widely applicable.

5．The Other Side of the Fact ── The Role of Teacher Education

It might be necessary to examine the plausibility of the backward design from another perspective. In the previous section, I discussed the structure of the backward design at the school-based settings. In this section, I hope to offer an analysis on the teacher education side.

As I mentioned earlier, there has been a number of instances in learning where ideas grew organically. What are the roles of the teachers to contribute to the successful "growth" of the students' ideas? How should the teacher prepare the learning materials?

As I teach a course on education methodology at the Graduate School of Teacher Edu-cation of a university as a adjunct lecturer, several graduate students who are interested in the backward design voluntarily gather on Wednesday afternoons to discuss their teach-ing plans based on the backward design. What we learned from this weekly session is the basis of the following analysis.

I will elaborate a couple of insights that the seminar members and I run into during these years. First, we found out the successful backward design would need a tremendous amount of time spent on deciding the "things worth knowing deeply." As the Brookline Model indicates, the learning based on the backward design is an intentional change in the learning routines; what is the "big picture that is worth pondering"? This comes at the beginning.

Our seminar members had brain-storming sessions, so to speak, to decide the things worth understanding deeply. We felt that the "big picture" is essential concepts with hundreds of components. I will pick up two concepts we discussed.

The first one is the concept of "sustainability" that has increasingly become relevant in the contents of social studies and science in the schools in Japan. The exercise session turned out to be an visualizing process of the concept of sustainability. That is to say, the participating five members presented what they thought were the key components of sustainability. Five members had very distinctive set of viewpoints from which they look at the concept of sustainability. Here is a list of each participants' areas of interests.

(1) biomass
(2) alternative energy sources
(3) the restoration of small farming community
(4) small-and-medium sized business
(5) organic farming
(6) the recovery of the craftsmanship
(7) fuel efficiency
(8) energy efficiency of the solar panels
(9) sustainable forestry
(10) sustainable fishery
(11) ecologicl conscience
(12) education for the sustainable development
(13) sustainable lifestyle
(14) consumption society
(15) technical innovation directed toward sustainability
(16) forest ecology
(17) the problems of the top soil erosion

These are only a portion of what we kept in mind. The breadth and scope of "sustainability" gradually unfolded before our eyes. In this process, the semiar participants and I recognized the importance of knowing different kinds of interests and talents among the teachers. The next step was to find out the resources that were relevant to the classroom

instruction of social studies and science. Even a small topic listed above might develop into a substantial research project. At the same time, we had to stop when we felt we were too deeply involved. Let me illustrate how an item might develop into a classroom discussion. I will explain the role of the craftsmanship.

I chose an article about the role of the Meister in Germany. This article not only describes the history of the Meister system, it also analyzes the basis of the manufacturing industry in Germany.

While most European nations try to track all students into college, Germany sends a majority to vocational training. Rooted in the Guilds of the Middle Ages, the system offers training by—and, often, a job with—a Meister(professional). "Most German company leaders have gone through the system and they are proud of it…….Vocational training in Germany, unlike in most of Europe, is a respected, solid alternative to the traditional university. (Isabelle de Pommereau, 2013)

Honestly, the participating members did not notice at first the expansiveness of this seemingly unrelated topic of Meister system. Sustainability is not an abstract term; it began to be seen as a collection of the things around us. We often talk about career path as a separate topic, but when we know that Germany's manufacturing industry is sustainable because of the Meister-based career path, we are in a better position to understand what career path means.

Career education has increasingly been emphasized in the schools in Japan, but the role of the craftsmanship is not given enough attention. Deep understanding is sometimes achieved by using historical background, as this example shows. This is a kind of insight that our seminar members produced.

The importance of the historical perspectives in the preparation of the backward design became even more visible when I picked up the topic of recycle-based agricultural practices. As the following article "To save prairies, a reach into the past" shows, the century-old practice of holistic management is being well established in the western parts of the United States.

But on that patch of Colorado prairies, something different happened: the grass came back. Today, the grass has covered the sand….A dozen or more sandy, wind-blown basins have become lush and green. What made the difference was a simple idea with tremendous global consequences. The idea is called Holistic Management, and users say it is a powerful tool to undo the damage that humans have inflicted on grasslands worldwide. In the US, this is not fringe staff anymore. The fires are getting worse; floods are getting worse. When you show that you can do something to fix it, people want to know more. (Judith D. Schwartz, 2011)

This newspaper article reminds us that the whole concept of sustainability has something to do with the prevention of the mountain fires and the floods, the protection of the farmlands, the pasture, and the water resources. The concept of sustainability is to be applied both locally and globally.

The seminar members and I thought that the concept of sustainability is such a comprehensive topic that the teachers must be given a huge amount of preparation time. We also knew that teachers should be exposed to a wide variety of perspectives, information, and data as possible before they write teaching plans. The members felt that they were given a heavy stack of homework.

６．Teachers Need to Deepen Their Knowledge Base

In the history of the curriculum design, there has been similar ideas to the backward design, but few have been as teacher-oriented as the one proposed by Tony Kallet, a practitioner in Colorado in the 1960s. According to the editors of the *Few Adult Crawl* (a collection of Tony Kallet's academic articles), the innovative teachers "began to look for effective ways of changing telling into dialogue and of offering alternative routes to learning which used senses other than hearing and sight and depended on other intellectual skills than memory." (Introduction, by Bill Browse and Mary Brown)

In a pioneering essay "Notes on a Teacher's Job" written in 1963, Kallet offered a distinctively different learning model from the prevailing one with a special emphasis on "time" in the learning process. I am not arguing "the faster the better" model is good in which most of the innovators today seem to embrace. Note the nuance that Kallet placed on learning slowly.

"There increasingly appears to be virtues in letting things happen slowly. And as for what we displace, I fear that often it is the creative outpouring that gets displaced. I think the teacher's traditional role of purveyor of clear thinking to the masses needs very serious investigation."

What he was vaguely seeing in the 1960s was that children perceive "time" in a different way from the one we are in. Children are not immersed in the "faster the better" mentality unless they are trained. Kallet already saw the intrusion of "adult concept" into the classroom pedagogy. The faster the better model is so potent that most of us spend a fair amount of time doing exactly that.

The "slowness" in children's learning was the tendency to spend time pondering about

particular meanings of certain things around us. Tony Kallet was very consistent on the nature of learning process. In the article titled "Thoughts on Integrity" written in1966, he clarified the "big picture" approach to learning, as the following statement shows.

It is less profitable to try to make each teacher a generalist than it would be to try to make him thoroughly involved in the one or two areas which are most congenial to him. The same must be said of children in school, where the idea of the universal child has little to commend itself, provided each child has a wide universe of possibilities from which to choose his specialties.

This view is noteworthy in the brief history of the "backward design" in pedagogy, in the sense that the backward design is only possible when teachers cultivate "one or two areas which are most congenial to him."

In fact, it was from this statement that I got an inspiration on how the backward design should be connected to teacher education in general. Several publications on the structure of the backward design were avaible to the pedagogical community in the 1980s, but the weakness of these publications was they did not connect the structure of the backward design to the teacher training. I got the inspiration elsewhere, in the essays of Tony Kallet.

When we envision the connection between "one or two areas which are most congenial to him" to the teacher education programs, we can also envision a role of teachers who will let children have one or two areas which are most congenial to them. He made it clear that a teacher's job boils down to the following three, which was quite a challenging statement even in the 1960s.

(1) the preparation of the environment
(2) the binding of time, space, and of ideas
(3) the cultivation of misconceptions

This statement shows the correlation between teacher education and the curriculum design. In fact, this statement runs against the conventional wisdom that the curriculum must be build around "scope and sequence." Scope and sequence does not always guarantee the deep learning experiences, although the scope and sequence has been a pedagogical principle for such a long time. Most of the curriculum writers, to say nothing of the classroom teachers who use the standard curriculum, have rarely examined the validity of "connectedness" of seemingly unrelated contents. Seen from this standpoint, Kallet assumed that wholesome learning experience cannot be separated from connecting experiencce of seemingly unrelated things. The idea of sequence, in contrast, takes "compartmenting" for granted. When one finishes a unite, it is finished. No need to examine the connectedness with the previous and

the following unite. However, Tony Kallet was vocal on the validity of connecting unrelated things.

The ability to bind is the crucial difference between adults and children.......When I look at the best teachers at their best, it seems to me that it is this kind of binding that they are doing constantly. (page 10)

Because the concept of the backward design is common among people who believe that so-called "big pictures" are more important than merely digesting every bits of content in sequence, we should look at how "big ideas" are formed. I hope to mention Wes Jackson who did a pioneering work on the land conservation and wholesome agricultural practices in the 1970s and beyond. Jackson was not a curriculum writer, but he established a clear set of big idea goals when he founded the Land Institute. Jackson's ideas were explained by Wendell Berry.

The curriculum does not consist of departmental courses but of a set of steps repeated every semester:
  (1) Development of checklists of environmental problems
  (2) Attempt to analyze and understand the problems
  (3) A search for new or alternative solutions
  (4) Work toward an ecological ethic

A student, at step three, may work on a problem of energy, shelter, or waste management, but the school's primary focus is on the problem of soil loss and the development of a sustainable agriculture. In this work, Wes has been guided by the assumption that you cannot understand agriculture on its own terms. Agriculture depends on nature; if you want to understand agriculture, therefore, you must understand what preceded it. "New Roots for Agricultural Research" *The Gift of Good Land*, p.243

Wes Jackson uses the term "problem solving." What is the position of the problem-solving in the entire landscape of the backward design? I assume that Wes Jackson's use of the "problem-solving" carries a unique nuance, as shown above. He does not make use of the ready-made answers. It seems to me that Wes Jackson did not assume the linear progression of problem solving. On the contrary, Jackson knew too well that the matters surrounding "land" are full of unanswerable questions.

Here we are posed an essential topic in the discussion of the backward design; Is the backward design another fad in the problem-solving learning or project-based learning? Both the problem-solving learning and the project-based learning have won recognition

among educators as effective methodologies to let learners obtain understanding on their own. However, there has been little discussion on the role of "pondering" in these methodologies. It is my impression that both the problem-solving learning and the project-based learning value the efficiency of research work and the persuasive edge of the presentations. The power of pondering runs opposite to the quickness and efficiency; the pondering process is the think-deeply process.

It should be noted that the clear advantage of the "backward design" lies in connecting seemingly unrelated things. When the "big pictures" become visible, these pictures may provide a starting points of the backward design. The big pictures are placed at the start-line of learning experiences for the students. The problem of this approach is that the "big pictures" are inaccessible to the curriculum writers unless they spend an enormous amount of time themselves pondering upon the problems in a given area. Wendell Berry wrote that "the idea is to think a problem through and understand it as fully as possible, not to learn a ready-made answer; the problems of most interest at the Land Institute don't have ready-made answers. (p.242, 243)

As I stressed, the power of pondering counts most when it comes to learning deeply through the backward design. It should also be noted that the supporters of "pondering" in education are currently found elsewhere.

References

Berry, Wendell. (1981). *The Gift of Good Land: Further Essays Cultural and Agricultural*. North Point Press.

Drucker, P. (1985). *Innovation and Entrepreneurship: Practice and Principles*. Harper & Row.

Gardner, Howard. (1998). "Foreword", In David Allen, *Assessing Student Learning: From grading to understanding*. Teachers College Press, pp. vii-x.

Kallet, Tony. (1995). *FEW ADULTS CRAWL: Thoughts on Young Children Learning.*, (Selected, Edited, and Introduced by Bill Browse and Mary Brown), North Dakota Study Group on Evaluation, Center for Teaching and Learning, University of North Dakota.

Oda, Katsumi.(2011).*The Sustainable Society and Education*. Academeia Press.(In Japanese)

Oda, Katsumi.(1999). *Learning Through Portfolios and Assessment*. Gakuji. (In Japanese)

Perrone, Vito. (1991). A *Letter to Teachers: Reflections on schooling and the art of teaching*. Jossey-Bass Publishers.

Pommereau, Isabelle de. (2013), "Preparing to work with a Meister." *The Christian Science Monitor Weekly*, September 2, p.31.

Schwartz, Judith D. (2011). "To save prairies, a reach into the past." *The Christian Science Monitor Weekly*, October 31, p.19.

The Philadelphia Teachers' Learning Cooperative. (1984) "On Becomong Teacher Experts: Buying Time." In *Language Arts*, Volume 61, Number 7, pp.731-735.

Ueland, Brenda. (2011). *If You Want to Write*. Martino Publishing.(Originally published in 1938.)

（おだ　かつみ　本学非常勤講師）