

Avoiding Dewey's Dilemma: Agentive Mind in Action

Sebastian SAINOO-FULLER

概 要

本論は、認知・精神発達に影響を与えるコンストラクティビスト学習論と数理認識論・シンボル処理論を比較する。現代の認識論からのコンストラクティビスト学習論と社会文化的学習および周辺性に関する人類学的研究を論じる。さらに、教室におけるコンストラクティビスト学習論と社会文化的学習論の有効性を検証する。

Keywords:

Education, Constructionism, Socio-Cultural, Computational, Symbol-Processing, S-P, Peripherality, Dewey, Cobb, Bruner.

Critical Analysis

In *Where is the Mind?* Cobb (1999) looks at mathematics educational research trends over the previous decade. These can be broadly divided into two factions, the Socio-cultural and the Constructivist (what Bruner (1999) would liken to computational, or the Structuralist Bredo (1999) to the Symbol-Processing (hereinafter S-P) view of Mind). Cobb finally comes to the conclusion that both trends are complementary, though different, and although stopping short of demanding a dogmatic synthesis of the two, he, rather like Dewey (1916, in Bredo 1999 p25) argues for the pragmatic deployment of both in the classroom, embedding theory within practice. Dewey recognizes that to synthesize artificially “theory then (becomes) impractical and practice (becomes) atheoretical, impoverishing both” (*ibid*).

Here, firstly Constructivist theories will be compared to S-P (Bredo) and Computational (Bruner) views of mind, before looking at how this impacts constructivist and Socio-cultural views of learning, especially in relation to teaching environmental debate in English to non-native speakers in a tertiary

institution in Japan. Finally recent discoveries of the physical properties on the brain will be mentioned in terms of their implications for lifelong learners especially in my field. I conclude with a description of my view of learning in the light of my reading for this course, and how this impacts what and how I teach.

When considering the Constructivist trend in terms of S-P and Computational views of mind, one must consider that Constructivism is a research trend in pedagogy whereas the S-P/Computational paradigm is a model for the human mind. Basically Constructivism (and Cobb's Socio-culturalism) is about "claiming hegemony for their view of what it means to know and learn mathematics" (Steffe, 1996, Voigt; 1992; in Cobb 1999, p135), whereas S-P/Computationalism are ways of looking at how individuals allegedly process stimuli into action within their heads. Bredo analyses S-P through its implicit computer analogy using binary dualisms, whereas Bruner brings psycho-social considerations into play and introduces 9 tenets arguing for a situated understanding of an individual's learning.

Saying this both Constructivism and S-P/Computationalism are reactions against the theories of learning developed from Behaviorist school of psychology in the early part of the 20th century and are drawn from advances in information technology. They also draw the same criticisms from Bredo and Bruner. Behaviorists, such as Pavlov, used animal experiments to demonstrate that animals learnt behavior from a stimuli-response pattern. This was redefined into educational practice as *drill-response*. This demonstrates the key problem for both Bruner and Bredo, the disempowerment of the learner. The teacher determines the *problem* (what Bruner calls a "misfit", Bruner "blocked action" and Lave (1988) terms a "dilemma") and the student reacts. In contrast under a situated learning environment the planning is dynamic, the learners goals are refined in the process, with new goals often emerging, and the problems are defined by the learner. In his *Mind and Body* dualism, Bredo asserts that mind and body are inseparable since the physical interaction involved in inquiry (often as trial and error) is part of a process of acting "mindfully". In a situated approach as envisaged by Clancy (1993) perception and action are one.

Besides the issue of problem solving (*mind and body*), Bredo addresses the nature of tasks (*individual and society*), and knowledge and tasks (*language and reality*). If *Mind/body* highlights the separation of learner from task, then Bredo's individual/society dichotomy shows the isolation of the individual from a group. Even at the basic level, there is the teacher and learner (Bruner: the interactional tenet 4), and the learner has to figure out what their ascribed task is. The fact that occasionally the learner fails to enact the teacher's specified curriculum/task

shows the last problem Bredo deals with under the dualism of *language/reality*. S-P has a implicit belief in representationalism, the logical positivistic belief that symbols match up to an objective communal reality. Knowledge exists extra somatically, and must be broken up into digestible chunks to be fed to learners. As Bredo (as does Bruner in the constructivism tenet 3) points out this is a self-effacing argument, since how did the symbols initially acquire their meaning? Additionally, a computer receives input, processes and outputs without understanding the meaning of the symbols (Clancy (1993 cited by Bredo 1999) points out that although the output from a human and a calculator may be the same, we should not confuse the representations of behavior (i.e. the outcome) with the phenomenon we would like to model). Bruner makes the same point through his first tenet, that meaning is hermeneutically organized through textual analysis.

A situated Socio-cultural model, emphasizing the dialectical relationships between agentive minds, allows for what Bruner calls Scaffolding through peer-peer, or peer-expert learning. Mutual support is an inbuilt function of socializing. As mentioned above re-iterative task/goal formulation is common, as is the renegotiation of the meaning of the task, and individual perception develops. Furthermore, such learning is embedded in experience, and enables learners to build an Oeuvre, or move into an accepted area of expert practice. Socio-cultural trends however emphasize perception. Computational/S-P contains the assumption that information is given and received uniformly, whereas situated learning demands the learner notice a problem (also referred to as a misfit/blocked action /or dilemma). Clancy calls this "conceiving", Bredo "interpretation", enabling an agentive approach to learning.

To summarize, under a Computational/S-P analogy, Learning is reduced to knowledge acquisition, dispensed by experts and processed by learners. It is a Positivist approach, the learner is separate from and acts on (not interacts with) the environment. Other learners are at best objects within the environment. Learning is a controlled search, a process to truth, without trial and error. The tasks are clearly defined (sensory input/stimulus), fed into a learner who heuristically processes symbols according to the rules, and are fed out in the form of action/goals. A situated Socio-cultural model, emphasizing the dialectical relationships between agentive minds, allows for what Bruner calls Scaffolding through peer-peer, or peer-expert learning, re-iterative task/goal formulation, renegotiation of meaning, and develops individual perception. Furthermore, such learning is embedded in experience, and enables learners to build an Oeuvre, or move into an accepted area of expert practice.

Sacks (1999) corroborates the socio-cultural model's emphasis on the agentive mind in recalling Edelman's research on the brain. Edelman's Neural Darwinism, or Theory of Neural Group Selection (TNGS) divides neural selection into two, developmental selection, which is responsible for the fine details of cortical circuiting which are unique for each individual and innate mechanisms, such as the swallowing reflex. More importantly for our purposes is experiential selection, whereby each brain constructs its own world based on its perception of reality. This perception is shaped by genetic factors, but basically each brain has to figure it out for itself. This plasticity and self-development underlies the agentive characteristic of Mind. Experience is an active process constructed by an organism. It makes its own maps, categorizes its own categories through a process of re-entrant signaling. Each map is in continuous communication with other maps, unlike the S-P mind, which can only control or correct external stimuli. This process of re-categorization constitutes memory, and is the product of activity. In contrast, the S-P mind is like a ROM disk. Under Computational and S-P theory, the mind always has an external programmer, feeding in signals. This programmer has control over the stimuli, and Edelman describes this as brain an orchestra with a conductor. Edelman's Mind is an orchestra when everyone is making their own music, without a conductor, communicating with nods and winks. He also uses the metaphor of a journey, as one moves through life learning new memories. This journey is through the situated socio-cultural world of people, not in isolation in the library. This is good news for language students as there is no age ceiling or limit to the experience the agentive Mind can map. However, there are some motor skills related to the throat involved in vocalization which are easier to pick up in youth, which enable one to speak with a native accent. Saying this, I have met many language learners who have not started until the thirties or later, who have accumulated a native accent through practice, suggesting that this need not be an insurmountable obstacle.

Practice.

As for my view of learning, in terms of language teaching, the Computation/S-P model is useful in many ways. Concrete nouns, simple adjectives and verbs do match up exactly with the phenomena they signify. A blue chair signifies a blue chair. When teaching irregular verb tenses, substitution drills are effective ways of introducing and reinforcing. The teacher has to select the knowledge to be taught since the learner has no experience nor any way to predict the irregularities. But at the more advanced level of, say, environmental debate, where the students have studied formally for a number of years prior, a situated model is more effective,

allowing students peer interaction, and the opportunity to develop new goals and tasks reiteratively. Saying this, one factor not discussed by the researchers is that of teaching techniques and classroom management. Language is by definition a social activity and is intrinsically embedded (situated) in daily experience to a degree that macro-economic theory or carpentry are not.

A few teacher-centered activities, substitution drills, or other Computational/S-P exercises are often a useful way of restoring control when learners become distracted. Especially with anxious learners, the clarity of a well designed smartly-paced straightforward S-P task is a great way to start or round off a lesson, as well as installing confidence (Bruner's 8th tenet) and encouraging metacognition (Bruner p154). By co-coordinating the socio-cultural and computational we can empower the students to develop their own narrative (Bruner's 9th tenet). Bredo offers four ways of dealing with the issues; of formalizing (the domination of rational thought processes and formal positivism); informalizing (prioritizing non-formal non-Western, non-academic ways of learning); divorce (two types of cognition, one theoretical, one symbolic, unconnected and mutually irrelevant); and the collaborative. There is room for the universal and the particular, for grammar pattern practice, and for individual self-expression. Personally, I find the diversity Bredo advocates in this final option exciting and liberating, and gives me a wider access to mental tools in my teaching practice.

Analyzing and Observing Practice.

Activity: Pair Presentations

The enacted curriculum, as interpreted by myself is illustrated in Appendix One. I am teaching an intensive debate class on Wednesday afternoons to the second and third year students in the Environmental Sciences Faculty at Nagasaki University, with two other foreign lecturers. Please refer to the updated revised syllabus I have been using this semester for the purposes of this project. The previous syllabus I have used in four previous courses (over two semesters) can be found in Appendix 2. The key changes I would like to draw attention to is the Pair Presentations section of the course, and the removal of individual speeches. I have moved the Group Presentations to the start of the course and introduced a green-movie (*Gorillas in the Mist*) to help stimulate the students' debate on environmental topics later in the course. For the purpose of this debate, I would like to concentrate upon the change from the Individual Speeches/Presentations learning activity to the Pair Presentations, in terms of position within the structure

of the course, in comparative terms with the feedback from the previous courses I have taught, and based upon the analytical techniques I will apply based upon the internalization of the theories discussed above.

Description of the Enacted activity

I teach two classes of intermediate speakers of English. One group has 16 upper intermediate speakers, whilst the other group holds 24 lower intermediate students. Characteristically, the students are hesitant, bordering upon anxious speakers of English, and are mostly Japanese with 2 Chinese overseas students. The Chinese students are both more motivated since they are self-funding. They have all studied the language for at least six years, though mostly with the intention to pass the University Entrance Examination. This course, though compulsory is part of the General Educational Requirements (GER), and is not taken so seriously by management (refer to Policy Documents by Matsuda 2000) nor by the students. Saying this the students are well behaved, polite and on the whole positive, though there is a degree of hostility, especially with regard the international political scene at present. A few of the boys expressed a clear dislike of the language and the GER to me in Japanese. In general the learners respond well to teacher-centric activities, and have a very high attendance (4 absences in both groups for 10 lessons).

Context

In the first four class periods the students divided into groups of four, each group choosing a topic from the required textbook (Takada 2001). The textbook is the only top down requirement we have, there being no other monitoring of our teaching. To prevent the course becoming a reading course, each group presented one chapter to the rest of the group, who listened and make notes. The presentation is mock-formal to give the rough atmosphere of an international conference. After the presentation, I asked members of the audience to field simple comprehension questions.

When each group has given a presentation, in week 5, I asked the students to brainstorm ideas for environmental topics in pairs on paper. Then I instigated a "Blackboard race" where the class is divided into teams of 3, formed queues in front of the board and wrote as many topics in English on the board as possible in a relay style race. The students then return to their places and in groups of two or three chose and prepared a topic in English to give the following week. They are asked to use as much English as possible in discussion and to refer to their textbook and their vocabulary notebooks they have been using since week 1 (Group Presentations) to jot down Environmental words. The only instructions I gave them

was that they are completely free to choose the setting and style. I asked them to think about a setting/ style they would find relevant to their experience, and that they enjoy the activity. The next week the Pair Presentations were delivered, and were followed the following two classes with a movie and a related activity before moving on in the course to debating games and techniques. The course culminated in a refereed debate based on themes which emerge in the movie, *Gorillas in the Mist* regarding animal rights and human rights in an environmental context.

The Pair Presentations themselves are aimed at creating a context conducive to **legitimate peripheral participation** (Lave and Wenger 1999), with myself acting an expert occupying one centre of several potential centers. I want to follow Piaget's model of dialectic peer interaction and enable a situation where students can openly exchange ideas. I want the more able or confident students also to act as centres of gravity to empower their peers to increase their level of participation. The Group Presentations in the previous weeks were deliberately orthodox, top-down asymmetrical teacher-centric in the S-P/ Computational style. I wanted to feed Environmental vocabulary to the students as well as making all of them stand up and speak, to break the ice. I made a point of explicitly grading their talks on content, brevity and confidence. I emphasize effort and participation over "talent". They are familiar with this style of teaching, and so it gives the anxious/nervous learners some reassurance and it helps establish my credibility through this familiarity (note that this is a GER course). If I were to attempt to Shock and Awe them with a battery of new techniques, it would result in more anxiety and little or no participation. Ironically in this case, to participate in the traditional socio-cultural framework of teaching, it means orienting one's class heavily towards a conservative (Neo)Confucian Computational/S-P style of teaching, at least initially. I want to ease them into a more dynamic agentive form of learning, without the danger that they assume that if there are few explicit tasks/goals, then it cannot be properly assessed and so they need not try hard. The purpose of the conservative Computational/ S-P Group Presentation task was also to empower the student by moving her towards relevance and relatedness, Lave and Wenger's criteria for legitimizing participation, to help her (in Marx's words) "ascend (from the particular and abstract) to the concrete". Thus the knowledge gained from Group Presentations can be re-contextualized from the de-context (of an abstracted academic textbook) and the classroom context into a context and language of the learner's own choice. By removing direction but providing support I am willfully disempowering myself, moving to the periphery so that I can act as a peer, and help afford the learner the opportunity for articulation and interchange

with others, and open up a "nexus of relations which would otherwise go unnoticed" (Lave and Wenger 1999) and pave the way for full participation. I follow Vygotsky's ideal (Rogoff 1999 p79) whereby the learners and I are not equal but the inequality in this activity comes from my English skill, environmental knowledge and debating experience rather than status. In the past I was more heavy handed with this part of the course too taking what Piaget would term asymmetrical interactions, treating the presentation as an individually assessed speech, putting pressure on each student in turn, and preventing other students from actively participating. Later, in the debating section of the course, I traditionally stepped back and gave the students free rein to allow them what Piaget would term cognitive restructuring through dialectic debate (i.e. the opportunity to fight out what is true and what is false between themselves), but it will be useful to compare the new structure with the former. The assessment system is made clear to them. I will value effort, participation, co-operation, enthusiasm and content. Of course extra credit will go for humour and innovation. My marking tends to the generous: I do not use a normative scale of any kind. If any student attends, performs and improves, she can expect a high mark.

Evaluating Practice

1)Types of Pair Presentation:

I was pleasantly surprised by the diversity (Bruner's 1st tenet), imagination and effort that appeared. Without any guidance from me, one group had a role play based on recycling where two female learners ganged up against one male miscreant to lecture him on the benefit of recycling. They started off antagonistic, but reached a consensus to change their behaviour (Bruner's 4th tenet). It was a perfect example of Piaget's cognitive restructuring through dialectic debate. Another group of female learners memorized a dialogue set in a coffee shop discussing "what is a natural lifestyle?". It was point-counterpoint, elegantly executed. One pair of male learners took the topic of nuclear energy. One boy was the bad points, the other the physical embodiment of the good points, and both spoke in the first person. They used clear logical structure, followed a strong dialectic (in that consensus was not an issue: there has to be a winner and a loser) At the end they challenged the other students to vote for a winner, and fielded questions as a sort of hustings. This was the exact image of legitimate peripheral participation that I had in mind when I designed the exercise as the other students could engage with the topic and the other learners as far as they felt comfortable doing so, and have to admit that I got rather more involved than I intended to (I only realized this later watching the video!)

What also came though from the students presentations was their attitude towards English and Environmentalism. The males tended to see English as a logical tool or even a weapon. They had confidence to work from notes and to challenge each other. They tend to work more closely from the textbook. The female learners saw English more as a form of entertainment for coffee shops and general discussion. When they challenged people's behaviour they tended to reach a consensus with a friend and then gang up on the malefactor. Their memorization showed the clear effort they invested in the project and the emphasis they placed on presentation. All in all there was something there for everyone to learn from, myself included. And most the students seemed to enjoy themselves, compared with the Individual Presentations of the previous courses, when without fail someone would doze off in the audience. Instead they are constructing their own learning narratives and metacognition(Bruner's 9th tenet), and were proud of their Oeuvre (Bruner's 5th tenet).

2) I was fortunate to have a degree of technology available to me. I borrowed a friend's movie camera and filmed the Pair Presentations. I was surprised to see what I missed as I was concentrating on assessing their performance I did not pay enough attention to the audience. I was planning to move to the back of the class and help the listeners follow the talking. Although my intention was to stay to the periphery, I found myself joining in more than I ought. This is a key point to develop in the future. I imagine however much one feels one is standing back, one cannot help gravitating back to the center. The biggest lesson I feel that I have learnt is that it takes a lot of confidence in one's teaching methodology and in one's students to be quiet, trust the learners to do the job and observe them.

3) Informal interviews. Not having an office, I took a handful of available students to MacDonald's for coffee and explained what I am doing with this activity and why I need some frank answers. They were most informative and helped me check and tabulate the questionnaires. Pair work helped them avoid shyness, I was told, and they liked the loose structure of the activity. At first the lack of direction made them all uneasy, but they claim that they found it refreshing. The gender issues mentioned in Nozaki (1993) were still present, but at any rate 2 female students came to join us for coffee. The Pair Presentations were popular because the students could show consensus and co-operation rather than conflict, though everyone enjoyed the Debating Games where the "conflict" was arbitrary and tongue-in-cheek. Also as the Pair Presentations were scripted, the female students had a chance to hold the speaking turn longer than usual, which

they enjoyed and developed their self-esteem (Bruner's 8th tenet). They were all able to overcome shyness and avoid being the centre-of-attention which my individual presentation regime enforced. In the statement of aims I produce before designing the curriculum I wrote:

“ I want to create a class where everyone feels comfortable participating, where more passive styles of learning are also given credit. When the students work in mixed sex groups the boys take the initiative and the girls are occasionally sidelined. However I do not think segregation will resolve the issue either (indeed I wonder if segregated sex schooling is one factor behind this phenomenon). Instead I am proposing timing each speaker to give everyone ample equal opportunity to hold the speaking turn.”

I feel that the Pair Presentation system has enabled this without increasing the “informal conversation activities”, which threaten to dilute the academic “thinking” (as opposed to “doing”) part of the course.

To conclude.

By moving away from a traditional lecture-based class I was able to enable a curriculum based on participation. Traditional participatory models rely on group work (with the teacher as epicenter) or pairwork, where the learners either model the paradigmic phrase (a Computational technique), or following the teacher's orders, try to solve a simple puzzle together (an S-P approach). Using pairwork/small groups with peer review and a simple initial framework, I was able to produce a flexible empowering peer learning environment, with myself as one center of many within the group dynamic. The students, even those who were openly hostile at the start of the course were soon constructing their own learning narrative and showing metacognitive skills.

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Appendix One

Sebastian Fuller's Revised Published Syllabus for the Faculty of Environmental Science

Language Communication A1 and A2

授業のねらい

This course is aimed at developing students' communicative ability, focusing on current Environment Issues. Students who successfully complete this course will be able to negotiate, debate and offer environmental solutions to an international audience.

Individual presentational skills, group debate skills, and academic presentational

skills will be emphasized and examined through coursework that will contribute towards the final examination score.

授業内容と方法

The main reading text will be *Echoes of the Environment* (Tsurumi Shoten 2001, 2nd Edition). The students will be expected to do some reading outside class which will form the background for classwork. Using this text as a starting point student will be expected to gather together and introduce their own thoughts to the class. Students will give short individual presentations in the first half of the course, moving on to group presentations and finally debate. Although some basic English ability is assumed, examination criteria will be based on the ability to compose thoughts logically and present them in an informed, interesting and persuasive manner in English. Extra credit will be given to students who respond to other students' presentations in a thoughtful and stimulating manner. Although improvement in student's English ability is expected, students' development and participation will factor highly in the final grade.

授業計画

- 第一回 Orientation and Class Reading
- 第二回 Introduction to Group Presentations in English
- 第三回 Group Presentations (Textbook Chapter Presentation)
- 第四回 Group Presentations (Textbook Chapter Presentation)
- 第五回 Pair Presentations (Free Topic)
- 第六回 Pair Presentations (Free Topic)
- 第七回 Pair Presentations (Free Topic)
- 第八回 Gorillas In the Mist Video (Part I) and activity
- 第九回 Gorillas In the Mist Video (Part II) and activity
- 第十回 Introduction to Debating
- 第十一回 Balloon Debates, Celebrity Debates
- 第十二回 Introduction to Debating Environmental Issues
- 第十三回 Debating
- 第十四回 Debating
- 第十五回 Short written examination based on *Echoes of the Environment*

Appendix Two

Former Enacted Syllabus

Language Communication A1 and A2

授業のねらい

This course is aimed at developing students' communicative ability, focusing on current Environment Issues. Students who successfully complete this course will be able to negotiate, debate and offer environmental solutions to an international audience.

Individual presentational skills, group debate skills, and academic presentational skills will be emphasized and examined through coursework which will contribute towards the final examination score.

授業内容と方法

The main reading text will be *Echoes of the Environment* (Tsurumi Shoten 2001, 2nd Edition). The students will be expected to do some reading outside class which will form the background for classwork. Using this text as a starting point student will be expected to gather together and introduce their own thoughts to the class. Students will give short individual presentations in the first half of the course, moving on to group presentations and finally debate. Although some basic English ability is assumed, examination criteria will be based on the ability to compose thoughts logically and present them in an informed, interesting and persuasive manner in English. Extra credit will be given to students who respond to other students' presentations in a thoughtful and stimulating manner. Although improvement in student's English ability is expected, students' development and participation will factor highly.

授業計画

- 第一回 Orientation and Class Reading
- 第二回 Introduction to Short Presentations in English
- 第三回 Presentations
- 第四回 Presentations
- 第五回 Presentations

- 第六回 Presentations
- 第七回 Presentations
- 第八回 Introduction to Group Presentations
- 第九回 Group Presentations
- 第十回 Group Presentations
- 第十一回 Group Presentations
- 第十二回 Introduction to Debating Environmental Issues
- 第十三回 Debating
- 第十四回 Debating
- 第十五回 Short written examination based on *Echoes of the Environment*

E-mail : fuller@tc.nagasaki-gaigo.ac.jp