CONSTRUCTIVISM & STUDENT CENTERED LEARNING

8.   JEROME BRUNER

8.1. Bruner's Background

Jerome Bruner is one of the pioneers of the cognitive psychology movement in the United States. This began through his own research when he began to study sensation and perception as being active, rather than passive processes. In 1947, Bruner published his classic study *Value and Need as Organizing Factors in Perception* in which poor and rich children were asked to estimate the size of coins or wooden disks the size of American pennies, nickels, dimes, quarters and half-dollars. The results showed that the value and need the poor and rich children associated with coins caused them to significantly overestimate the size of the coins, especially when compared to their more accurate estimations of the same size disks. Similarly, another classic study conducted by Bruner and Leo Postman showed slower reaction times and less accurate answers when a deck of playing cards reversed the color of the suit symbol for some cards (e.g. red spades and black hearts). These series of experiments issued in what some called the New Look psychology, which challenged psychologists to study not just an organism's response to a stimulus, but also its internal interpretation. After these experiments on perception, Bruner turned his attention to the actual cognitions that he had indirectly studied in his perception studies.

In 1956, Bruner published a book, *A Study of Thinking,* which formally initiated the study of cognitive psychology. Soon afterwards, Bruner helped found the Center of Cognitive Studies, at Harvard. After a time, Bruner began to research other topics in psychology. Beginning around 1967, Bruner turned his attention toward the subject of developmental psychology. Bruner studied the way children learned and coined the term scaffolding to describe the way children often build on the information they have already mastered. In his research on the development of children Bruner proposed three modes of representation; enactive representation (action-based), iconic representation (image-based), and symbolic representation (language-based). Rather than neatly delineated stages, the modes of representation are integrated and only loosely sequential as they translate into each other. Symbolic representation remains the ultimate mode, for it is clearly the most mysterious of the three. Bruner's theory suggests it is efficacious when faced with

new material to follow a progression from enactive to iconic to symbolic representation. This holds true even for adult learners. A true instructional designer, Bruner's work also suggests that a learner, even of a very young age, is capable of learning any material so long as the instruction is organized appropriately, in sharp contrast to the beliefs of Piaget and other stage theorists. Like Bloom's Taxonomy, Bruner suggests a system of coding in which people form a hierarchical arrangement of related categories. Each successively higher level of categories becomes more specific, echoing Benjamin Bloom's understanding of knowledge acquisition as well as the related idea of instructional scaffolding.

In accordance with this understanding of learning, Bruner proposed the spiral curriculum, a teaching approach in which each subject or skill area is revisited at intervals, at a more sophisticated level each time. Bruner's spiral curriculum draws heavily from evolution to explain how to learn better and thus it drew criticism from conservatives. First there is basic knowledge of a subject, then more sophistication is added, reinforcing the same principles that were first discussed. This system is used in China. In the United States classes are split by grade, life sciences in 9th grade, chemistry in 10th, and physics in 11th. The spiral teaches life sciences, chemistry, physics all in one year, then two subjects, then one, then all three again to understand how they mold together. Bruner also believes learning should be spurred by interest in the material rather than tests or punishment, we learn best when we find the knowledge we're obtaining appealing.

While Bruner was at Harvard he published a series of works about his assessment of current educational systems and ways that education could be improved. In 1961, he published the book, *Process of Education*. Bruner also served as a member of the Educational Panel, of the President's Science Advisory Committee, during the presidencies of John F. Kennedy and Lyndon Johnson. Referencing his overall view that education should not focus merely on the memorization of facts, Bruner wrote that knowing how something is put together is worth a thousand facts about it. From 1964 -1996, Bruner sought to develop a complete curriculum for the educational system that would meet the needs of students in three main areas which he called "Man: A Course of Study". Bruner wanted to create an educational environment that would focus on (1) what was uniquely human about human beings, (2) how humans got that way and (3) how humans could become more so. In 1966, Bruner published another book relevant to education, *Towards a Theory of Instruction,* and then in 1973, another book, *The Relevance of Education* was published.

In 1990 he returned to the subject and gave a series of lectures. The lectures were compiled into a book, *Acts of Meaning,* and in these lectures, Bruner refuted the computer model for studying the mind, advocating a more holistic understanding of the mind and its cognitions.

Finally, in 1996, Bruner wrote another book, *The Culture of Education,* reassessing the state of educational practices three decades after he had begun his educational research. Bruner was also credited with helping found the early childcare program Head Start. Bruner was deeply impressed by his 1995 visit to the preschools of Reggio Emilia and has established a collaborative relationship with them to improve educational systems internationally. Equally important was the relationship with the Italian Ministry of Education who officially recognized the value of this innovative experience.

8.2. Language Development

In 1972, Bruner was appointed Watts Professor of Experimental Psychology at the University of Oxford, where he remained until 1980. In his Oxford years, Bruner focused on early language development. Rejecting the nativist account of language acquisition proposed by Noam Chomsky, Bruner offered an alternative in the form of an interactionist or social interactionist theory of language development. In this approach, the social and interpersonal nature of language was emphasized. Following Lev Vygotsky the Russian theoretician of socio-cultural development, Bruner proposed that social interaction plays a fundamental role in the development of cognition in general and language in particular. He emphasized that children learn language in order to communicate, and at the same time, they also learn the linguistic code. Meaningful language is acquired in the context of meaningful parent infant interaction, learning scaffolded or supported by the child's Language Acquisition Support System (LASS).

In Oxford, Bruner collected a large group of graduate students and post-doctoral fellows who participated in the effort to understand how young children manage to crack the linguistic code. Much emphasis was placed on employing the then revolutionary method of videotaped home observations, Bruner showing the way to a new wave of researchers to get out of the laboratory and take on the complexities of naturally occurring events in a child's life. This work was published in a large number of journal articles, and in 1983 Bruner published a summary of them in the book, *Child's Talk: Learning to Use Language*. This

decade of research firmly established Bruner at the helm of the interactionist approach to language development, exploring such themes as the acquisition of communicative intents and the development of their linguistic expression; the interactive context of language use in early childhood; and the role of parental input and scaffolding behavior in the acquisition of linguistic forms. This work rests on the assumptions of a social constructivist theory of meaning according to which meaningful participation in the social life of a group as well as meaningful use of language involve an interpersonal, intersubjective, collaborative process of creating shared meaning. The elucidation of this process became the focus of Bruner's next period of work.

8.3. Bruner's Early Work and Four Key Themes

Bruner was one of the founding fathers of constructivist theory. Constructivism is a broad conceptual framework with numerous perspectives, and Bruner's is only one. Bruner's theoretical framework is based on the theme that learners construct new ideas or concepts based upon existing knowledge. Learning is an active process. Facets of the process include selection and transformation of information, decision making, generating hypotheses, and making meaning from information and experiences. Bruner's theories emphasize the significance of categorization in learning. He suggested, "To perceive is to categorize, to conceptualize is to categorize, to learn is to form categories, to make decisions is to categorize." Interpreting information and experiences by similarities and differences is also a key concept.

Bruner was influenced by Piaget's ideas about cognitive development in children. During the 1940's his early work focused on the impact of needs, motivations, and expectations (mental sets) and their influence on perception. He also looked at the role of strategies in the process of human categorization and development of human cognition. He presented the point of view that children are active problem-solvers and capable of exploring difficult subjects. This was widely divergent from the dominant views in education at the time, but found an audience. Bruner emphasized the role of structure in learning and how it may be made central in teaching. Structure refers to relationships among factual elements and techniques. He introduced the ideas of readiness for learning and spiral curriculum. Bruner believed that any subject could be taught at any stage of development in a way that fit the child's cognitive abilities. Spiral curriculum refers to the idea of revisiting basic ideas over and over, building upon them and elaborating to the level of full

understanding and mastery. Bruner believed that intuitive and analytical thinking should both be encouraged and rewarded. He believed the intuitive skills were underemphasized and he reflected on the ability of experts in every field to make intuitive leaps.

Additionally, Bruner investigated motivation for learning. He felt that ideally, interest in the subject matter is the best stimulus for learning. Bruner did not like external competitive goals such as grades or class ranking. Eventually Bruner was strongly influenced by Vygotsky's writings and began to turn away from the intrapersonal focus he had had for learning and began to adopt a social and political view of learning. Bruner argued that aspects of cognitive performance are facilitated by language. He stressed the importance of the social setting in the acquisition of language. His views are similar to those of Piaget, but he places more emphasis on the social influences on development. The earliest social setting is the mother-child dyad, where children work out the meanings of utterances to which they are repeatedly exposed. Bruner identified several important social devices including joint attention, mutual gaze, and turn-taking. Bruner also incorporated Darwinian thinking into his basic assumptions about learning. He believed it was necessary to refer to human culture and primate evolution in order to understand growth and development. He did, however, believe there were individual differences and that no standard sequence could be found for all learners. He considered instruction as an effort to assist or shape growth. In 1996 he published *The Culture of Education*. This book reflected his changes in viewpoints since the 1960's. He adopted the point of view that culture shapes the mind and provides the raw material with which we constrict our world and our self-conception.

8.4. Theory of Instruction and Categorization

The four features of Bruner's Theory of Instruction are outlined below;

1. Predisposition to learn - This feature specifically states the experiences which move the learner toward a love of learning in general, or of learning something in particular. Motivational, cultural, and personal factors contribute to this. Bruner emphasized social factors and early teachers and parents' influence on this. He believed learning and problem solving emerged out of exploration. Part of the task of a teacher is to maintain and direct a child's spontaneous explorations.
2. Structure of knowledge - It is possible to structure knowledge in a way that enables the learner to most readily grasp the information. This is a relative feature,

as there are many ways to structure a body of knowledge and many preferences among learners. Bruner offered considerable detail about structuring knowledge. Understanding the fundamental structure of a subject makes it more comprehensible. Bruner viewed categorization as a fundamental process in the structuring of knowledge. Details are better retained when placed within the context of an ordered and structured pattern. To generate knowledge which is transferable to other contexts, fundamental principles or patterns are best suited. The discrepancy between beginning and advanced knowledge in a subject area is diminished when instruction centers on a structure and principles of orientation. This means that a body of knowledge must be in a simple enough form for the learner to understand it and it must be in a form recognizable to the student's experience.

3. Modes of representation - Visual, words, symbols.

4. Effective sequencing - No one sequencing will fit every learner, but in general, increasing difficulty. Sequencing, or lack of it, can make learning easier or more difficult.

Bruner gave much attention to categorization of information in the construction of internal cognitive maps. He believed that perception, conceptualization, learning, decision making, and making inferences all involved categorization. Bruner suggested a system of coding in which people form a hierarchical arrangement of related categories. Each successively higher level of categories becomes more specific, echoing Benjamin Bloom's understanding of knowledge acquisition as well as the related idea of instructional scaffolding (Bloom's Taxonomy). Categories are rules that specify four things about objects as indicated below;

1. Criterial attributes - Required characteristics for inclusion of an object in a category. (e.g., for an object to be included in the category car it must have an engine, 4 wheels, and be a possible means of transportation).

2. The second rule prescribes how the criterial attributes are combined.

3. The third rule assigns weight to various properties. (e.g., it could be a car even if a tire was missing, and if it was used for hauling cargo it would be shifted to a different category of truck or perhaps van).

4. The fourth rule sets acceptance limits on attributes. Some attributes can vary widely, such as color. Others are fixed. For example a vehicle without an engine is not a car. Likewise, a vehicle with only two wheels would not be included in "car".

Bruner also postulated three stages of intellectual development. The first stage he termed "Enactive", when a person learns about the world through actions on physical objects and the outcomes of these actions. The second stage was called "Iconic" where learning can be obtained through using models and pictures. The final stage was "Symbolic" in which the learner develops the capacity to think in abstract terms. Based on this three-stage notion, Bruner recommended using a combination of concrete, pictorial then symbolic activities will lead to more effective learning.