Handbook of

Constructivism

(Concepts and Theories)

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Constructivism (learning theory)

Jean Piaget: founder of Constructivism

Constructivism is a theory of knowledge (epistemology) that argues that humans generate knowledge and meaning from an interaction between their experiences and their ideas. During infancy, it is an interaction between their experiences and their reflexes or behavior-patterns. Piaget called these systems of knowledge *schemata*. Constructivism is not a specific pedagogy, although it is often confused with constructionism, an educational theory developed by Seymour Papert, inspired by constructivist and experiential learning ideas of Jean Piaget. Piaget's theory of constructivist learning has had wide ranging impact on learning theories and teaching methods in education and is an underlying theme of many education reform movements. Research support for constructivist teaching techniques has been mixed, with some research supporting these techniques and other research contradicting those results.

History

In past centuries, constructivist ideas were not widely valued due to the perception that children's play was seen as aimless and of little importance. Jean Piaget did not agree with these traditional views, however. He saw play as an important and necessary part of the student's cognitive development and provided scientific evidence for his views. Today, constructivist theories are influential throughout much of the non-formal learning sector. One good example of constructivist learning in a non-formal setting is the Investigate Centre at The Natural History Museum, London. Here visitors are encouraged to explore a collection of real natural history specimens, to practice some scientific skills and make discoveries for themselves.

Writers who influenced constructivism include:

- John Dewey (1859–1952)
- Maria Montessori (1870–1952)
- Władysław Strzemiński (1893–1952)
- Jean Piaget (1896–1980)
- Lev Vygotsky (1896–1934)
- Heinz von Foerster (1911–2002)
- Jerome Bruner (1915-)
- Herbert Simon (1916–2001)
- Paul Watzlawick (1921–2007)
- Ernst von Glasersfeld (1917–2010)
- Edgar Morin (1921-)

Constructivist theory

Formalization of the theory of constructivism is generally attributed to Jean Piaget, who articulated mechanisms by which knowledge is internalized by learners. He suggested that through processes of *accommodation* and *assimilation*, individuals construct new knowledge from their experiences. When individuals assimilate, they incorporate the new experience into an already existing framework without changing that framework. This may occur when individuals' experiences are aligned with their internal representations of the world, but may also occur as a failure to change a faulty understanding; for example, they may not notice events, may misunderstand input from others, or may decide that an event is a fluke and is therefore unimportant as information about the world. In contrast, when individuals' experiences contradict their internal representations, they may change their perceptions of the experiences to fit their internal representations. According to the theory, accommodation is the process of reframing one's mental representation of the external world to fit new experiences. Accommodation can be understood as the mechanism by which failure leads to learning: when we act on the expectation that the world operates in one way and it violates our expectations, we often fail, but by accommodating this new experience and reframing our model of the way the world works, we learn from the experience of failure, or others' failure.

It is important to note that constructivism is not a particular pedagogy. In fact, constructivism is a theory describing how learning happens, regardless of whether learners are using their experiences to understand a lecture or following the instructions for building a model airplane. In both cases, the theory of constructivism suggests that learners construct knowledge out of their experiences. However, constructivism is often associated with pedagogic approaches that promote active learning, or learning by doing.

Constructivist learning intervention

The nature of the learner

The learner as a unique individual

Social constructivism views each learner as a unique individual with unique needs and backgrounds. The learner is also seen as complex and multidimensional. Social constructivism not only acknowledges the uniqueness and complexity of the learner, but actually encourages, utilizes and rewards it as an integral part of the learning process (Wertsch 1997).

The importance of the background and culture of the learner

Social constructivism or socioculturalism encourages the learner to arrive at his or her version of the truth, influenced by his or her background, culture or embedded worldview. Historical developments and symbol systems, such as language, logic, and mathematical systems, are inherited by the learner as a member of a particular culture and these are learned throughout the learner's life. This also stresses the importance of the nature of the learner's social interaction with knowledgeable members of the society. Without the social interaction with other more knowledgeable people, it is impossible to acquire social meaning of important symbol systems and learn how to utilize them. Young children develop their thinking abilities by interacting with other children, adults and the physical world. From the social constructivist viewpoint, it is thus important to take into account the background and culture of the learner throughout the learning process, as this background also helps to shape the knowledge and truth that the learner creates, discovers and attains in the learning process (Wertsch 1997).

The responsibility for learning

Furthermore, it is argued that the responsibility of learning should reside increasingly with the learner (Glasersfeld, 1989). Social constructivism thus emphasizes the importance of the learner being actively involved in the learning process, unlike previous educational viewpoints where the responsibility rested with the instructor to teach and where the learner played a passive, receptive role. Von Glasersfeld (1989) emphasized that learners construct their own understanding and that they do not simply mirror and reflect what they read. Learners look for meaning and will try to find regularity and order in the events of the world even in the absence of full or complete information.

The Harkness Discussion Method

It is called the "Harkness" discussion method because it was developed at Phillips Exeter Academy with funds donated in the 1930s by Edward Harkness. It involves students seated in a circle, motivating and controlling their own discussion. The teacher acts as little as possible. Perhaps the teacher's only function is to observe, although he/she might begin or shift or even direct a discussion. The students get it rolling, direct it, and focus it.

They act as a team, cooperatively, to make it work. They all participate, but not in a competitive way. Rather, they all share in the responsibility and the goals, much as any members share in any team sport. Although the goals of any discussion will change depending upon what's under discussion, some goals will always be the same: to illuminate the subject, to unravel its mysteries, to interpret and share and learn from other points of view, to piece together the puzzle using everyone's contribution. Discussion skills are important. Everyone must be aware of how to get this discussion rolling and keep it rolling and interesting. Just as in any sport, a number of skills are necessary to work on and use at appropriate times. Everyone is expected to contribute by using these skills.

The motivation for learning

Another crucial assumption regarding the nature of the learner concerns the level and source of motivation for learning. According to Von Glasersfeld (1989) sustaining motivation to learn is strongly dependent on the learner's confidence in his or her potential for learning. These feelings of competence and belief in potential to solve new problems, are derived from first-hand experience of mastery of problems in the past and are much more powerful than any external acknowledgment and motivation (Prawat and Floden 1994). This links up with Vygotsky's "zone of proximal development" (Vygotsky 1978) where learners are challenged within close proximity to, yet slightly above, their current level of development. By experiencing the successful completion of challenging tasks, learners gain confidence and motivation to embark on more complex challenges.

The role of the instructor

Instructors as facilitators

According to the social constructivist approach, instructors have to adapt to the role of facilitators and not teachers (Bauersfeld, 1995). Whereas a teacher gives a didactic lecture that covers the subject matter, a facilitator helps the learner to get to his or her own understanding of the content. In the former scenario the learner plays a passive role and in the latter scenario the learner plays an active role in the learning process. The emphasis thus turns away from the instructor and the content, and towards the learner (Gamoran, Secada, & Marrett, 1998). This dramatic change of role implies that a facilitator needs to display a totally different set of skills than a teacher (Brownstein 2001). A teacher tells, a facilitator asks; a teacher lectures from the front, a facilitator supports from the back; a teacher gives answers according to a set curriculum, a facilitator provides guidelines and creates the environment for the learner to arrive at his or her own conclusions; a teacher mostly gives a monologue, a facilitator is in continuous dialogue with the learners (Rhodes and Bellamy, 1999). A facilitator should also be able to adapt the learning experience 'in mid-air' by taking the initiative to steer the learning experience to where the learners want to create value.

The learning environment should also be designed to support and challenge the learner's thinking (Di Vesta, 1987). While it is advocated to give the learner ownership of the

problem and solution process, it is not the case that any activity or any solution is adequate. The critical goal is to support the learner in becoming an effective thinker. This can be achieved by assuming multiple roles, such as consultant and coach.

A few strategies for cooperative learning include

- Reciprocal Questioning: students work together to ask and answer questions
- Jigsaw Classroom: students become "experts" on one part of a group project and teach it to the others in their group
- Structured Controversies: Students work together to research a particular controversy (Woolfolk 2010)

The nature of the learning process

Learning is an active, social process

Social constructivism, strongly influenced by Vygotsky's (1978) work, suggests that knowledge is first constructed in a social context and is then appropriated by individuals (Bruning et al., 1999; M. Cole, 1991; Eggan & Kauchak, 2004). According to social constructivists, the process of sharing individual perspectives-called *collaborative elaboration* (Meter & Stevens, 2000)-results in learners constructing understanding together that wouldn't be possible alone (Greeno et al., 1996)

Social constructivist scholars view learning as an active process where learners should learn to discover principles, concepts and facts for themselves, hence the importance of encouraging guesswork and intuitive thinking in learners (Brown et al.1989; Ackerman 1996). In fact, for the social constructivist, reality is not something that we can discover because it does not pre-exist prior to our social invention of it. Kukla (2000) argues that reality is constructed by our own activities and that people, together as members of a society, invent the properties of the world.

Other constructivist scholars agree with this and emphasize that individuals make meanings through the interactions with each other and with the environment they live in. Knowledge is thus a product of humans and is socially and culturally constructed (Ernest 1991; Prawat and Floden 1994). McMahon (1997) agrees that learning is a social process. He further states that learning is not a process that only takes place inside our minds, nor is it a passive development of our behaviours that is shaped by external forces and that meaningful learning occurs when individuals are engaged in social activities.

Vygotsky (1978) also highlighted the convergence of the social and practical elements in learning by saying that the most significant moment in the course of intellectual development occurs when speech and practical activity, two previously completely independent lines of development, converge. Through practical activity a child constructs meaning on an intrapersonal level, while speech connects this meaning with the interpersonal world shared by the child and her/his culture.

Dynamic interaction between task, instructor and learner

A further characteristic of the role of the facilitator in the social constructivist viewpoint, is that the instructor and the learners are equally involved in learning from each other as well (Holt and Willard-Holt 2000). This means that the learning experience is both subjective and objective and requires that the instructor's culture, values and background become an essential part of the interplay between learners and tasks in the shaping of meaning. Learners compare their version of the truth with that of the instructor and fellow learners to get to a new, socially tested version of truth (Kukla 2000). The task or problem is thus the interface between the instructor and the learner (McMahon 1997). This creates a dynamic interaction between task, instructor and learner. This entails that learners and instructors should develop an awareness of each other's viewpoints and then look to their own beliefs, standards and values, thus being both subjective and objective at the same time (Savery 1994).

Some studies argue for the importance of mentoring in the process of learning (Archee and Duin 1995; Brown et al. 1989). The social constructivist model thus emphasizes the importance of the relationship between the student and the instructor in the learning process.

Some learning approaches that could harbour this interactive learning include reciprocal teaching, peer collaboration, cognitive apprenticeship, problem-based instruction, web quests, anchored instruction and other approaches that involve learning with others.

Collaboration among learners

Learners with different skills and backgrounds should collaborate in tasks and discussions to arrive at a shared understanding of the truth in a specific field (Duffy and Jonassen 1992).

Most social constructivist models, such as that proposed by Duffy and Jonassen (1992), also stress the need for collaboration among learners, in direct contradiction to traditional competitive approaches. One Vygotskian notion that has significant implications for peer collaboration, is that of the zone of proximal development. Defined as the distance between the actual developmental level as determined by independent problem-solving and the level of potential development as determined through problem-solving under adult guidance or in collaboration with more capable peers, it differs from the fixed biological nature of Piaget's stages of development. Through a process of 'scaffolding' a learner can be extended beyond the limitations of physical maturation to the extent that the development process lags behind the learning process (Vygotsky 1978).

Learning by teaching (LdL) as constructivist method

If students have to present and train new contents with their classmates, a non-linear process of collective knowledge-construction will be set up.

The importance of context

The social constructivist paradigm views the context in which the learning occurs as central to the learning itself (McMahon 1997).

Underlying the notion of the learner as an active processor is "the assumption that there is no one set of generalised learning laws with each law applying to all domains" (Di Vesta 1987:208). Decontextualised knowledge does not give us the skills to apply our understandings to authentic tasks because, as Duffy and Jonassen (1992) indicated, we are not working with the concept in the complex environment and experiencing the complex interrelationships in that environment that determine how and when the concept is used. One social constructivist notion is that of authentic or situated learning, where the student takes part in activities directly relevant to the application of learning and that take place within a culture similar to the applied setting (Brown et al. 1989). Cognitive apprenticeship has been proposed as an effective constructivist model of learning that attempts to "enculturate students into authentic practices through activity and social interaction in a way similar to that evident, and evidently successful, in craft apprenticeship" (Ackerman 1996:25).

Holt and Willard-Holt (2000) emphasize the concept of dynamic assessment, which is a way of assessing the true potential of learners that differs significantly from conventional tests. Here the essentially interactive nature of learning is extended to the process of assessment. Rather than viewing assessment as a process carried out by one person, such as an instructor, it is seen as a two-way process involving interaction between both instructor and learner. The role of the assessor becomes one of entering into dialogue with the persons being assessed to find out their current level of performance on any task and sharing with them possible ways in which that performance might be improved on a subsequent occasion. Thus, assessment and learning are seen as inextricably linked and not separate processes (Holt and Willard-Holt 2000).

According to this viewpoint instructors should see assessment as a continuous and interactive process that measures the achievement of the learner, the quality of the learning experience and courseware. The feedback created by the assessment process serves as a direct foundation for further development.

The selection, scope, and sequencing of the subject matter

Knowledge should be discovered as an integrated whole

Knowledge should not be divided into different subjects or compartments, but should be discovered as an integrated whole (McMahon 1997; Di Vesta 1987).

This also again underlines the importance of the context in which learning is presented (Brown et al. 1989). The world, in which the learner needs to operate, does not approach one in the form of different subjects, but as a complex myriad of facts, problems, dimensions, and perceptions (Ackerman 1996).

Engaging and challenging the learner

Learners should constantly be challenged with tasks that refer to skills and knowledge just beyond their current level of mastery. This captures their motivation and builds on previous successes to enhance learner confidence (Brownstein 2001). This is in line with Vygotsky's zone of proximal development, which can be described as the distance between the actual developmental level (as determined by independent problem-solving) and the level of potential development (as determined through problem-solving under adult guidance or in collaboration with more capable peers) (Vygotsky 1978).

Vygotsky (1978) further claimed that instruction is good only when it proceeds ahead of development. Then it awakens and rouses to life an entire set of functions in the stage of maturing, which lie in the zone of proximal development. It is in this way that instruction plays an extremely important role in development.

To fully engage and challenge the learner, the task and learning environment should reflect the complexity of the environment that the learner should be able to function in at the end of learning. Learners must not only have ownership of the learning or problem-solving process, but of the problem itself (Derry 1999).

Where the sequencing of subject matter is concerned, it is the constructivist viewpoint that the foundations of any subject may be taught to anybody at any stage in some form (Duffy and Jonassen 1992). This means that instructors should first introduce the basic ideas that give life and form to any topic or subject area, and then revisit and build upon these repeatedly. This notion has been extensively used in curricula.

It is also important for instructors to realize that although a curriculum may be set down for them, it inevitably becomes shaped by them into something personal that reflects their own belief systems, their thoughts and feelings about both the content of their instruction and their learners (Rhodes and Bellamy 1999). Thus, the learning experience becomes a shared enterprise. The emotions and life contexts of those involved in the learning process must therefore be considered as an integral part of learning. The goal of the learner is central in considering what is learned (Brown et al. 1989; Ackerman 1996).

The structuredness of the learning process

It is important to achieve the right balance between the degree of structure and flexibility that is built into the learning process. Savery (1994) contends that the more structured the learning environment, the harder it is for the learners to construct meaning based on their conceptual understandings. A facilitator should structure the learning experience just enough to make sure that the students get clear guidance and parameters within which to achieve the learning objectives, yet the learning experience should be open and free enough to allow for the learners to discover, enjoy, interact and arrive at their own, socially verified version of truth.

In adult learning

Constructivist ideas have been used to inform adult education. Where pedagogy applies to the education of children, adults educators often speak instead of andragogy. Methods must take account of differences in learning, due to the fact that adults have many more experiences and previously existing neurological structures.

Approaches based on constructivism stress the importance of mechanisms for mutual planning, diagnosis of learner needs and interests, cooperative learning climate, sequential activities for achieving the objectives, formulation of learning objectives based on the diagnosed needs and interests.

Personal relevance of the content, involvement of the learner in the process, and deeper understanding of underlying concepts are some of the intersections between emphases in constructivism and adult learning principles.

Pedagogies based on constructivism

Various approaches in pedagogy derive from constructivist theory. They usually suggest that learning is accomplished best using a hands-on approach. Learners learn by experimentation, and not by being told what will happen, and are left to make their own inferences, discoveries and conclusions.

Research and evidence supporting constructivism

Hmelo-Silver, Duncan, & Chinn cite several studies supporting the success of the constructivist problem-based and inquiry learning methods. For example, they describe a project called GenScope, an inquiry-based science software application. Students using the GenScope software showed significant gains over the control groups, with the largest gains shown in students from basic courses.

Hmelo-Silver et al. also cite a large study by Geier on the effectiveness of inquiry-based science for middle school students, as demonstrated by their performance on high-stakes standardized tests. The improvement was 14% for the first cohort of students and 13% for the second cohort. This study also found that inquiry-based teaching methods greatly reduced the achievement gap for African-American students.

Guthrie et al. (2004) compared three instructional methods for third-grade reading: a traditional approach, a strategies instruction only approach, and an approach with strategies instruction and constructivist motivation techniques including student choices, collaboration, and hands-on activities. The constructivist approach, called CORI (Concept-Oriented Reading Instruction), resulted in better student reading comprehension, cognitive strategies, and motivation.

Jong Suk Kim found that using constructivist teaching methods for 6th graders resulted in better student achievement than traditional teaching methods. This study also found that

students preferred constructivist methods over traditional ones. However, Kim did not find any difference in student self-concept or learning strategies between those taught by constructivist or traditional methods.

Doğru and Kalender compared science classrooms using traditional teacher-centered approaches to those using student-centered, constructivist methods. In their initial test of student performance immediately following the lessons, they found no significant difference between traditional and constructivist methods. However, in the follow-up assessment 15 days later, students who learned through constructivist methods showed better retention of knowledge than those who learned through traditional methods.

Criticism of educational constructivism

Several cognitive psychologists and educators have questioned the central claims of constructivism. It is argued that constructivist theories are misleading or contradict known findings. Matthews (1993) attempts to sketch the influence of constructivism in current mathematics and science education, aiming to indicate how pervasive Aristotle's empiricist epistemology is within it and what problems constructivism faces on that account.

In the neo-Piagetian theories of cognitive development it is maintained that learning at any age depends upon the processing and representational resources available at this particular age. That is, it is maintained that if the requirements of the concept to be understood exceeds the available processing efficiency and working memory resources then the concept is by definition not learnable. Therefore, however active a child is in a learning endeavor, to learn the child must operate in a learning environment that meets the developmental and individual learning constraints that are characteristic for the child's age and this child's possible deviations from her age's norm. If this condition is not met, construction goes astray.

Several educators have also questioned the effectiveness of this approach toward instructional design, especially as it applies to the development of instruction for novices (Mayer, 2004; Kirschner, Sweller, and Clark, 2006). While some constructivists argue that "learning by doing" enhances learning, critics of this instructional strategy argue that little empirical evidence exists to support this statement given novice learners (Mayer, 2004; Kirschner, Sweller, and Clark, 2006). Sweller and his colleagues argue that novices do not possess the underlying mental models, or "schemas" necessary for "learning by doing" (e.g. Sweller, 1988). Indeed, Mayer (2004) reviewed the literature and found that fifty years of empirical data do not support using the constructivist teaching technique of pure discovery; in those situations requiring discovery, he argues for the use of guided discovery instead.

Mayer (2004) argues that not all teaching techniques based on constructivism are efficient or effective for all learners, suggesting many educators misapply constructivism to use teaching techniques that require learners to be behaviorally active. He describes this inappropriate use of constructivism as the "constructivist teaching fallacy". "I refer to

this interpretation as the constructivist teaching fallacy because it equates active learning with active teaching." (Mayer, 2004, p. 15). Instead Mayer proposes learners should be "cognitively active" during learning and that instructors use "guided practice."

In contrast, Kirschner, et al. (2006) describe constructivist teaching methods as "unguided methods of instruction." They suggest more structured learning activities for learners with little to no prior knowledge. Slezak states that constructivism "is an example of fashionable but thoroughly problematic doctrines that can have little benefit for practical pedagogy or teacher education." Constructivist Foundations 6(1): 102–111 and similar views have been stated by Meyer (Meyer D. L. (2008) The poverty of constructivism. Educational Philosophy and Theory 41(3): 332–341.) Boden, Quale and others.

Kirschner et al. also group a number of learning theories together (Discovery, Problem-Based, Experiential, and Inquiry-Based learning), disregarding the differences and actual amount of structure and scaffolding included in the theories. Hmelo-Silver, Duncan, & Chinn have stated that highly scaffolded constructivist teaching methods like problem-based learning and inquiry learning are effective, and the evidence does not support Kirschner, Sweller, and Clark's conclusion. Hmelo-Silver et al. argue that Kirschner et al. "overlooked" research favorable to problem-based learning. They include in their response a 2003 meta-analysis showing PBL has benefits for knowledge application over traditional curriculum.

A rebuttal to the criticisms of Kirschner, Sweller, and Clark

While there are critics of the Kirschner, Sweller, and Clark article, Sweller and his associates have written in their articles about:

1. instructional designs for producing procedural learning (learning as behavior change) (Sweller, 1988);
2. their grouping of seemingly disparate learning theories (Kirschner et al., 2006) and;
3. a continuum of guidance beginning with worked examples that may be followed by practice, or transitioned to practice (Kalyuga, Ayres, Chandler, and Sweller, 2003; Renkl, Atkinson, Maier, and Staley, 2002)

Kirschner et al. (2006) describe worked examples as an instructional design solution for procedural learning. Clark, Nguyen, and Sweller (2006) describe this as a very effective, empirically validated method of teaching learners procedural skill acquisition. Evidence for learning by studying worked-examples, is known as the worked-example effect and has been found to be useful in many domains [e.g. music, chess, athletics (Atkinson, Derry, Renkl, & Wortham, 2000); concept mapping (Hilbert & Renkl, 2007); geometry (Tarmizi and Sweller, 1988); physics, mathematics, or programming (Gerjets, Scheiter, and Catrambone, 2004)].

Kirschner et al. (2006) describe why they group a series of seemingly disparate learning theories (Discovery, Problem-Based, Experiential, and Inquiry-Based learning). The reasoning for this grouping is because each learning theory promotes the same constructivist teaching technique -- "learning by doing." While they argue "learning by doing" is useful for more knowledgeable learners, they argue this constructivist teaching technique is not useful for novices. Mayer states that it promotes behavioral activity too early in the learning process, when learners should be cognitively active (Mayer, 2004).

In addition, Sweller and his associates describe a continuum of guidance, starting with worked examples to slowly fade guidance. This continuum of faded guidance has been tested empirically to produce a series of learning effects: the worked-example effect (Sweller and Cooper, 1985), the guidance fading effect (Renkl, Atkinson, Maier, and Staley, 2002), and the expertise-reversal effect (Kalyuga, Ayres, Chandler, and Sweller, 2003).

Criticism of discovery-based teaching techniques

> “After a half century of advocacy associated with instruction using minimal guidance, there appears no body of research supporting the technique. In so far as there is any evidence from controlled studies, it almost uniformly supports direct, strong instructional guidance rather constructivist-based minimal guidance during the instruction of novice to intermediate learners. Even for students with considerable prior knowledge, strong guidance while learning is most often found to be equally effective as unguided approaches. Not only is unguided instruction normally less effective; there is also evidence that it may have negative results when student acquire misconceptions or incomplete or disorganized knowledge”
>
> — Why Minimal Guidance During Instruction Does Not Work: An Analysis of the Failure of Constructivist, Discovery, Problem-Based, Experiential, and Inquiry-Based Teaching by Kirschner, Sweller, Clark

Mayer (2004) argues against discovery-based teaching techniques and provides an extensive review to support this argument. Mayer's arguments are against pure discovery, and are not specifically aimed at constructivism: "Nothing in this article should be construed as arguing against the view of learning as knowledge construction or against using hands-on inquiry or group discussion that promotes the process of knowledge construction in learners. The main conclusion I draw from the three research literatures I have reviewed is that it would be a mistake to interpret the current constructivist view of learning as a rationale for reviving pure discovery as a method of instruction."

Mayer's concern is how one applies discovery-based teaching techniques. He provides empirical research as evidence that discovery-based teaching techniques are inadequate. Here he cites this literature and makes his point “For example, a recent replication is research showing that students learn to become better at solving mathematics problems when they study worked-out examples rather than when they solely engage in hands-on problem solving (Sweller, 1999). Today’s proponents of discovery methods, who claim to draw their support from constructivist philosophy, are making inroads into educational practice. Yet a dispassionate review of the relevant research literature shows that discovery-based practice is not as effective as guided discovery.” (Mayer, 2004, p. 18)

Mayer’s point is that people often misuse constructivism to promote pure discovery-based teaching techniques. He proposes that the instructional design recommendations of constructivism are too often aimed at discovery-based practice (Mayer, 2004). Sweller (1988) found evidence that practice by novices during early schema acquisition, distracts these learners with unnecessary search-based activity, when the learner's attention should be focused on understanding (acquiring schemas).

The study by Kirschner et al. from which the quote at the beginning of this section was taken has been widely cited and is important for showing the limits of minimally-guided instruction. Hmelo-Silver et al. responded, pointing out that Kirschner et al. conflated constructivist teaching techniques such as inquiry learning with "discovery learning". This would agree with Mayer's viewpoint that even though constructivism as a theory and teaching techniques incorporating guidance are likely valid applications of this theory, nevertheless a tradition of misunderstanding has led to some question "pure discovery" techniques.

The math wars and discovery-based teaching techniques

The math wars controversy in the United States is an example of the type of heated debate that sometimes follows the implementation of constructivist-inspired curricula in schools. In the 1990s, mathematics textbooks based on new standards largely informed by constructivism were developed and promoted with government support. Although constructivist theory does not require eliminating instruction entirely, some textbooks seemed to recommend this extreme. Some parents and mathematicians protested the design of textbooks that omitted or de-emphasized instruction of standard mathematical methods. Supporters responded that the methods were to be eventually discovered under direction by the teacher, but since this was missing or unclear, many insisted the textbooks were designed to deliberately eliminate instruction of standard methods. In one commonly adopted text, the standard formula for the area of a circle is to be derived in the classroom, but not actually printed in the student textbook as is explained by the developers of CMP: "The student role of formulating, representing, clarifying, communicating, and reflecting on ideas leads to an increase in learning. If the format of the texts included many worked examples, the student role would then become merely reproducing these examples with small modifications."

Similarly, this approach has been applied to reading with whole language and inquiry-based science that emphasizes the importance of *devising* rather than just performing hands-on experiments as early as the elementary grades (traditionally done by research scientists), rather than studying facts. In other areas of curriculum such as social studies and writing are relying more on "higher order thinking skills" rather than memorization of dates, grammar or spelling rules or reciting correct answers.

Constructivist learning environments? ...for which learners?

During the 1990s, several theorists began to study the cognitive load of novices (those with little or no prior knowledge of the subject matter) during problem solving. Cognitive load theory was applied in several contexts (Paas, 1992; Moreno & Mayer, 1999; Mousavi, Low, & Sweller, 1995; Chandler and Sweller, 1992; Sweller & Cooper, 1985; Cooper & Sweller, 1987). Based on the results of their research, these authors do not support the idea of allowing novices to interact with ill-structured learning environments. Ill-structured learning environments rely on the learner to discover problem solutions (Jonassen, 1997). Jonassen (1997) also suggested that novices be taught with "well-structured" learning environments.

Jonassen (1997) also proposed well-designed, well-structured learning environments provide scaffolding for problem-solving. Finally both Sweller and Jonassen support problem-solving scenarios for more advanced learners (Jonassen, 1997; Kalyuga, Ayres, Chandler, and Sweller, 2003).

Sweller and his associates even suggest well-structured learning environments, like those provided by worked examples, are not effective for those with more experience—this was later described as the "expertise reversal effect" (Kalyuga et al., 2003). Cognitive load theorists suggest worked examples initially, with a gradual introduction of problem solving scenarios; this is described as the "guidance fading effect" (Renkl, Atkinson, Maier, and Staley, 2002; Sweller, 2003). Each of these ideas provides more evidence for Anderson's ACT-R framework (Clark & Elen, 2006). This ACT-R framework suggests learning can begin with studying examples.

Finally Mayer states: "Thus, the contribution of psychology is to help move educational reform efforts from the fuzzy and unproductive world of educational ideology—which sometimes hides under the banner of various versions of constructivism—to the sharp and productive world of theory-based research on how people learn."

Confusion between constructivist and maturationist views

Many people confuse constructivist with maturationist views. The constructivist (or cognitive-developmental) stream "is based on the idea that the dialectic or interactionist process of development and learning through the student's active construction should be facilitated and promoted by adults" (DeVries et al., 2002). Whereas, "The romantic maturationist stream is based on the idea that the student's naturally occurring development should be allowed to flower without adult interventions in a permissive

environment" (DeVries et al., 2002). In other words, adults play an active role in guiding learning in constructivism, while they are expected to allow children to guide themselves in maturationism.

Social constructivism

In recent decades, constructivist theorists have extended the traditional focus on individual learning to address collaborative and social dimensions of learning. It is possible to see *social constructivism* as a bringing together of aspects of the work of Piaget with that of Bruner and Vygotsky (Wood 1998: 39). The term *Communal constructivism* was developed by Leask and Younie (2001) through their research on the European School Net project which demonstrated the value of peer to peer learning i.e. communal construction of new knowledge rather than social construction of knowledge as described by Vygotsky where there is a learner to teacher scaffolding relationship. Bryn Holmes in 2001 applied this to student learning as described in an early paper, "in this model, students will not simply pass through a course like water through a sieve but instead leave their own imprint in the learning process."

Influence on computer science

Constructivism has influenced the course of programming and computer science. Some famous programming languages have been created, wholly or in part, for educational use, to support the constructionist theory of Seymour Papert. These languages have been dynamically typed, and reflective. Logo is the best known of them.

Chapter- 2

Constructivism (international relations)

In the discipline of international relations, **constructivism** is the claim that significant aspects of international relations are historically and socially contingent, rather than inevitable consequences of human nature or other essential characteristics of world politics.

Development

Nicholas Onuf is usually credited with coining the term "constructivism" to describe theories that stress the socially constructed character of international relations. Contemporary constructivist theory traces its roots to pioneering work not only by Onuf, but also by Richard K. Ashley, Friedrich Kratochwil, and John Ruggie. Nevertheless, Alexander Wendt is the best-known advocate of social constructionism in the field of international relations. Wendt's article "Anarchy is What States Make of It: the Social Construction of Power Politics" (1992) in *International Organization* laid the theoretical groundwork for challenging what he considered to be a flaw shared by both neorealists and neoliberal institutionalists, namely, a commitment to a (crude) form of materialism. By attempting to show that even such a core realist concept as "power politics" is socially constructed—-that is, not given by nature and hence, capable of being transformed by human practice--Wendt opened the way for a generation of international relations scholars to pursue work in a wide range of issues from a constructivist perspective. Wendt further developed these ideas in his central work, *Social Theory of International Politics* (1999).

Since the late 1980s and early 1990s, constructivism has become one of the major schools of thought within international relations. John Ruggie and others have identified several strands of constructivism. On the one hand, there are constructivist scholars such as Martha Finnemore, Kathryn Sikkink, Peter Katzenstein, and Alexander Wendt whose work has been widely accepted within the mainstream IR community and has generated vibrant scholarly discussions among realists, liberals, institutionalists, and constructivists. On the other hand, there are radical constructivists who take discourse and linguistics more seriously.

Theory

Constructivism primarily seeks to demonstrate how many core aspects of international relations are, contrary to the assumptions of Neorealism and Neoliberalism, *socially constructed*, that is, they are given their form by ongoing processes of social practice and interaction. Alexander Wendt calls two increasingly accepted basic tenets of Constructivism "(1) that the structures of human association are determined primarily by shared ideas rather than material forces, and (2) that the identities and interests of purposive actors are constructed by these shared ideas rather than given by nature".

Challenging realism

Because Neorealism was — during Constructivism's formative period — the dominant discourse of International Relations, much of Constructivism's initial theoretical work is in challenging certain basic Neorealist assumptions. Neorealists are fundamentally causal *Structuralists*, in that they hold that the majority of important content to international politics is explained by the structure of the international system, a position first advanced in Kenneth Waltz's *Man, the State and War* and fully elucidated in his core text of Neorealism, *Theory of International Politics*. Specifically, international politics is primarily determined by the fact that the international system is anarchic - it lacks any overarching authority, instead it is composed of units (states) which are formally equal - they are all sovereign over their own territory. Such anarchy, Neorealists argue, forces States to act in certain ways, specific, they can rely on no-one but themselves for security (they have to *Self-help*). The way in which anarchy forces them to act in such ways, to defend their own self-interest in terms of power, Neorealists argue, explains most of international politics. Because of this, Neorealists tend to disregard explanations of international politics at the 'unit' or 'state' level. Kenneth Waltz attacked such a focus as being reductionist.

Constructivism, particularly in the formative work of Wendt, challenges this assumption by showing that the causal powers attributed to 'Structure' by Neorealists are in fact not 'given', but rest on the way in which Structure is constructed by social practice. Removed from presumptions about the nature of the identities and interests of the actors in the system, and the meaning that social institutions (including Anarchy) have for such actors, Neorealism's 'structure' reveals, Wendt argues, very little, "it does not predict whether two states will be friends or foes, will recognize each other's sovereignty, will have dynastic ties, will be revisionist or status quo powers, and so on". Because such features of behavior are not explained by Anarchy, and require instead the incorporation of evidence about the interests and identities held by key actors, Neorealism's focus on the material structure of the system (Anarchy) is misplaced. But Wendt goes further than this - arguing that because the way in which Anarchy constrains states depends on the way in which States conceive of Anarchy, and conceive of their own identities and interests, Anarchy is not necessarily even a 'self-help' system. It only forces states to self-help if they conform to Neorealist assumptions about states as seeing security as a competitive, relative concept, where the gain of security for any one state means the loss of security for another. If States instead hold alternative conceptions of security, either 'co-operative',

where states can maximise their security without negatively affecting the security of another, or 'collective' where states identify the security of other states as being valuable to themselves, Anarchy will not lead to self-help at all. Neorealist conclusions, as such, depend entirely on unspoken and unquestioned assumptions about the way in which the meaning of social institutions are constructed by actors. Crucially, because Neorealists fail to recognize this dependence, they falsely assume that such meanings are unchangeable, and exclude the study of the processes of social construction which actually do the key explanatory work behind Neorealist observations.

Identities and interests

As Constructivists reject Neorealism's conclusions about the determining effect of anarchy on the behavior of international actors, and move away from Neorealism's underlying materialism, they create the necessary room for the identities and interests of international actors to take a central place in theorizing international relations. Now that actors are not simply governed by the imperatives of a self-help system, their identities and interests become important in analyzing how they behave. Like the nature of the international system, Constructivists see such identities and interests as not objectively grounded in material forces (such as dictates of the human nature that underpins Classical Realism) but the result of ideas and the social construction of such ideas. In other words the meanings of ideas, objects, and actors are all given by social interaction. We give objects their meanings and can attach different meanings to different things.

Martha Finnemore has been influential in examining the way in which international organizations are involved in these processes of the social construction of actor's perceptions of their interests. In *National Interests In International Society*, Finnemore attempts to "develop a systemic approach to understanding state interests and state behavior by investigating an international structure, not of power, but of meaning and social value". "Interests", she explains, "are not just 'out there' waiting to be discovered; they are constructed through social interaction". Finnemore provides three case studies of such construction - the creation of Science Bureaucracies in states due to the influence of UNESCO, the role of the Red Cross in the Geneva Conventions and the World Bank's influence of attitudes to poverty.

Studies of such processes are examples of the Constructivist attitude towards state interests and identities. Such interests and identities are central determinants of state behavior, as such studying their nature and their formation is integral in Constructivist methodology to explaining the international system. But it is important to note that despite this refocus onto identities and interests - properties of States - Constructivists are not necessarily wedded to focusing their analysis at the unit-level of international politics: the state. Constructivists such as Finnemore and Wendt both emphasize that while ideas and processes tend to explain the social construction of identities and interests, such ideas and processes form a structure of their own which impact upon international actors. Their central difference from Neorealists is to see the structure of international politics in primarily ideational, rather than material, terms.

Research areas

Many constructivists analyze international relations by looking at goals, threats, fears, cultures, identities, and other elements of "social reality" as social facts. In an important edited volume, constructivist scholars--including challenged many realist assumptions about the dynamics of international politics, particularly in the context of military affairs. Thomas J. Biersteker and Cynthia Weber applied constructivist approaches to understand the evolution of state sovereignty as a central theme in international relations, and works by Rodney Bruce Hall and Daniel Philpott (among others) developed constructivist theories of major transformations in the dynamics of international politics. In international political economy, the application of constructivism has been less frequent. Notable examples of constructivist work in this area include Kathleen R. McNamara's study of European Monetary Union and Mark Blyth's analysis of the rise of Reaganomics in the United States.

By focusing on how language and rhetoric are used to construct the social reality of the international system, constructivists are often seen as more optimistic about progress in international relations than versions of realism loyal to a purely materialist ontology, but a growing number of constructivists question the "liberal" character of constructivist thought and express greater sympathy for realist pessimism concerning the possibility of emancipation from power politics.

Constructivism is often presented as an alternative to the two leading theories of international relations, realism and liberalism, but some maintain that it is not necessarily inconsistent with one or both. Wendt shares some key assumptions with leading realist and neorealist scholars, such as the existence of anarchy and the centrality of states in the international system. However, Wendt renders anarchy in cultural rather than materialist terms; he also offers a sophisticated theoretical defense of the state-as-actor assumption in international relations theory. This is a contentious issue within segments of the IR community as some constructivists challenge Wendt on some of these assumptions (see, for example, exchanges in Review of International Studies, vol. 30, 2004).

Recent developments

A significant group of scholars who study processes of social construction self-consciously eschew the label "Constructivist." They argue that "mainstream" constructivism has abandoned many of the most important insights from linguistic-turn and social-constructionist theory in the pursuit of respectability as a "scientific" approach to international relations. Even some putatively "mainstream" constructivists, such as Jeffrey Checkel, have expressed concern that constructivists have gone too far in their efforts to build bridges with non-constructivist schools of thought.

A growing number of constructivists contend that current theories pay inadequate attention to the role of habitual and unreflective behavior in world politics. These advocates of the "practice turn" take inspiration from work in neuroscience, as well as

that of social theorists such as Pierre Bourdieu, that stresses the significance of habit in psychological and social life.

Chapter- 3

International Relations Theory

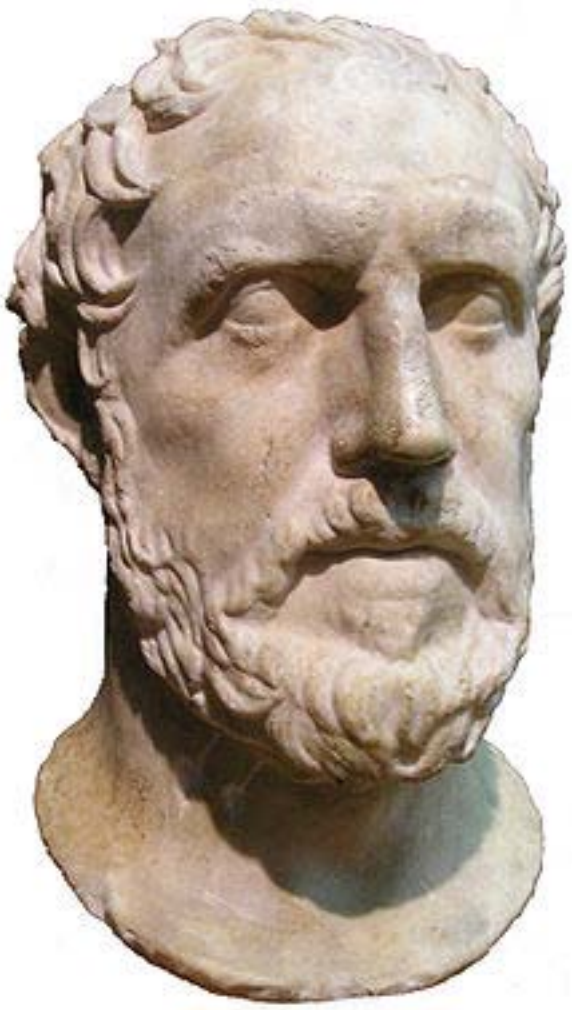
International relations theory is the study of international relations from a theoretical perspective; it attempts to provide a conceptual framework upon which international relations can be analyzed. Ole Holsti describes international relations theories act as a pair of coloured sunglasses, allowing the wearer to see only the salient events relevant to the theory. An adherent of realism may completely disregard an event that a constructivist might pounce upon as crucial, and vice versa. The three most popular theories are realism, liberalism and constructivism.

International relations theories can be divided into "positivist/rationalist" theories which focus on a principally state-level analysis, and "post-positivist/reflectivist" ones which incorporate expanded meanings of security, ranging from class, to gender, to postcolonial security. Many often conflicting ways of thinking exist in IR theory, including constructivism, institutionalism, Marxism, neo-Gramscianism, and others. However, two positivist schools of thought are most prevalent: realism and liberalism; though increasingly, constructivism is becoming mainstream and postpositivist theories are increasingly popular, particularly outside the United States.

Introduction

The study of International relations as theory can be traced to E.H. Carr's "The Twenty Years' Crisis" which was published in 1939 and to Hans Morgenthau's "Politics Among Nations" published in 1948. International relations as a discipline is believed to have emerged after the First World War with the establishment of a Chair of International Relations at the University of Wales, Aberystwyth. Early international relations scholarship in the Interwar years focused on the need for the balance of power system to be replaced with a system of collective security. These thinkers were later described as "Idealists". The leading critique of this school of thinking was the "realist" analysis offered by Carr.

Realism



Thucydides author of The Peloponnesian War is considered one of the earliest "realist" thinkers.

Realism or political realism has been the dominant theory of international relations since the conception of the discipline. The theory claims to rely upon an ancient tradition of thought which includes writers such as Thucydides, Machiavelli, and Rousseau. Early realism can be characterized as a reaction against interwar idealist thinking. The outbreak of World War II was seen by realists as evidence of the deficiencies of idealist thinking. There are various strands of modern day realist thinking. However, the main tenets of the theory have been identified as statism, survival, and self-help.

- **Statism:** Realists believe that nation states are the main actors in international politics. As such it is a state-centric theory of international relations. This contrasts with liberal international relations theories which accommodate roles for non-state actors and international institutions. This difference is sometimes expressed by describing a realist world view as one which sees nation states as

billiard balls, liberals would consider relationships between states to be more of a cobweb.

- **Survival:** Realists believe that the international system is governed by anarchy, meaning that there is no central authority. Therefore, international politics is a struggle for power between self-interested states.

- **Self-help:** Realists believe that no other nation states can be relied upon to help guarantee the state's survival.

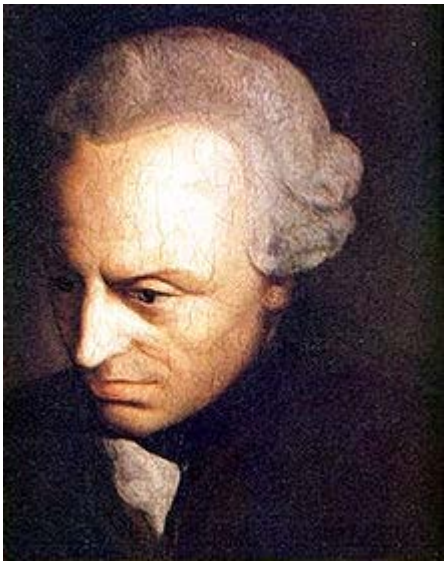
Realism makes several key assumptions. It assumes that nation-states are unitary, geographically-based actors in an anarchic international system with no authority above capable of regulating interactions between states as no true authoritative world government exists. Secondly, it assumes that sovereign states, rather than IGOs, NGOs or MNCs, are the primary actors in international affairs. Thus, states, as the highest order, are in competition with one another. As such, a state acts as a rational autonomous actor in pursuit of its own self-interest with a primary goal to maintain and ensure its own security—and thus its sovereignty and survival. Realism holds that in pursuit of their interests, states will attempt to amass resources, and that relations between states are determined by their relative levels of power. That level of power is in turn determined by the state's military and economic capabilities.

Some realists (*human nature realists*) believe that states are inherently aggressive, that territorial expansion is constrained only by opposing powers, while others (*offensive/defensive realists*) believe that states are obsessed with the security and continuation of the state's existence. The defensive view can lead to a security dilemma where increasing one's own security can bring along greater instability as the opponent(s) builds up its own arms, making security a zero-sum game where only *relative gains* can be made.

Neorealism

Neorealism or structural realism is a development of realism advanced by Kenneth Waltz in *Theory of International Politics*. It is, however, only one strand of neorealism. Joseph Grieco has combined neo-realist thinking with more traditional realists. This strand of theory is sometimes called "modern realism". Waltz's neorealism contends that the effect of structure must be taken into account in explaining state behavior. Structure is defined twofold as a) the ordering principle of the international system which is anarchy and b) the distribution of capabilities across units. Waltz also challenges traditional realism's emphasis on traditional military power, instead characterizing power in terms of the combined capabilities of the state.

Liberalism



Kant's writings on perpetual peace were an early contribution to Democratic peace theory.

The precursor to liberal international relations theory was "idealism". Idealism (or utopianism) was a term applied in a critical manner by those who saw themselves as 'realists', for instance E. H. Carr. Idealism in international relations usually refers to the school of thought personified in American diplomatic history by Woodrow Wilson, such that it is sometimes referred to as "Wilsonianism." Idealism holds that a state should make its internal political philosophy the goal of its foreign policy. For example, an idealist might believe that ending poverty at home should be coupled with tackling poverty abroad. Wilson's idealism was a precursor to liberal international relations theory, which would arise amongst the "institution-builders" after World War II.

Liberalism holds that state preferences, rather than state capabilities, are the primary determinant of state behavior. Unlike realism, where the state is seen as a unitary actor, liberalism allows for plurality in state actions. Thus, preferences will vary from state to state, depending on factors such as culture, economic system or government type. Liberalism also holds that interaction between states is not limited to the political/security ("high politics"), but also economic/cultural ("low politics") whether through commercial firms, organizations or individuals. Thus, instead of an anarchic international system, there are plenty of opportunities for cooperation and broader notions of power, such as cultural capital (for example, the influence of films leading to the popularity of the country's culture and creating a market for its exports worldwide). Another assumption is that absolute gains can be made through co-operation and interdependence—thus peace can be achieved.

The democratic peace theory argues that liberal democracies have never (or almost never) made war on one another and have fewer conflicts among themselves. This is seen as contradicting especially the realist theories and this empirical claim is now one of the

great disputes in political science. Numerous explanations have been proposed for the democratic peace. It has also been argued, as in the book *Never at War*, that democracies conduct diplomacy in general very differently from nondemocracies. (Neo)realists disagree with Liberals over the theory, often citing structural reasons for the peace, as opposed to the state's government. Sebastian Rosato, a critic of democratic peace theory points to America's behavior towards left-leaning democracies in Latin America during the Cold War to challenge democratic peace. One argument is that economic interdependence makes war between trading partners less likely. In contrast realists claim that economic interdependence increases rather than decreases the likelihood of conflict.

Neoliberalism

Neoliberalism, liberal institutionalism or neo-liberal institutionalism is an advancement of liberal thinking. It argues that international institutions can allow nations to successfully cooperate in the international system.

Post-Liberalism

Post-liberal theory argues that within the modern, globalized world, states in fact are driven to cooperate, in order to ensure security and sovereign interests. The departure from classical liberal theory is most notably felt in the re-interpretation of the concepts of Sovereignty and Autonomy. Autonomy becomes a problematic concept, shifting away from a notion of freedom of self-determination and agency to a heavily responsibility and duty laden concept. Importantly, autonomy is linked to a capacity for good governance. Similarly, sovereignty also experiences a shift from a right to a duty. In the global economy, International organisations hold sovereign states to account, leading to a situation where sovereignty is co-produced among 'sovereign' states. The concept becomes a variable capacity of good governance and can no longer be accepted as an absolute right. One possible way to interpret this theory, is the idea that in order to maintain global stability and security and solve the problem of the anarchic world system in International Relations, no overarching, global, sovereign authority is created. Instead, states collectively abandon some rights for full autonomy and sovereignty.

Constructivism

The standing of constructivism as an international relations theory increased after the fall of the Berlin wall (pictured) and Communism in Eastern Europe as this was something not predicted by the existing mainstream theories.

Constructivism, social constructivism or idealism has been described as a challenge to the dominance of neo-liberal and neo-realist international relations theories. Michael Barnett describes constructivist international relations theories as being concerned with how ideas define international structure, how this structure defines the interests and identities of states and how states and non-state actors reproduce this structure. The key tenet of constructivism is the belief that "International politics is shaped by persuasive ideas, collective values, culture, and social identities". Constructivism argues that international reality is socially constructed by cognitive structures which give meaning to the material world. The theory emerged out of debates concerning the scientific method of international relations theories and theories role in the production of international power. Emanuel Adler states that constructivism occupies a middle ground between rationalist and interpretative theories of international relations.

The failure of either realism or liberalism to predict the end of the Cold War boosted the credibility of constructivist theory. Constructivist theory criticises the static assumptions of traditional international relations theory and emphasize that international relations is a social construction. Constructivism is a theory critical of the ontological basis of rationalist theories of international relations. Whereas realism deals mainly with security and material power, and liberalism looks primarily at economic interdependence and domestic-level factors, constructivism most concerns itself with the role of ideas in shaping the international system (indeed it is possible there is some overlap between constructivism and realism or liberalism, but they remain separate schools of thought). By "ideas" constructivists refer to the goals, threats, fears, identities, and other elements

of perceived reality that influence states and non-state actors within the international system. Constructivists believe that these ideational factors can often have far-reaching effects, and that they can trump materialistic power concerns. For example, constructivists note that an increase in the size of the US military is likely to be viewed with much greater concern in Cuba, a traditional antagonist of the US, than in Canada, a close US ally. Therefore, there must be perceptions at work in shaping international outcomes. As such, constructivists do not see anarchy as the invariable foundation of the international system, but rather argue, in the words of Alexander Wendt, that "anarchy is what states make of it". Constructivists also believe that social norms shape and change foreign policy over time rather than security which realists cite.

Marxism and Critical Theory

Antonio Gramsci's writings on the hegemony of capitalism have inspired Marxist international relations scholarship

Marxist and Neo-Marxist international relations theories are structuralist paradigms which reject the realist/liberal view of state conflict or cooperation; instead focusing on the economic and material aspects. Marxist approaches argue the position of historical materialism and make the assumption that the economic concerns transcend others; allowing for the elevation of *class* as the focus of study. Marxists view the international system as an integrated capitalist system in pursuit of capital accumulation. A sub-discipline of Marxist IR is Critical Security Studies. Gramscian approaches rely on the ideas of Italian Antonio Gramsci whose writings concerned the hegemony that capitalism holds as an ideology. Marxist approaches have also inspired Critical Theorists such as Robert W. Cox who argues that "Theory is always for someone and for some purpose".

One notable Marxist approach to international relations theory is Immanuel Wallerstein's World-system theory which can be traced back to the ideas expressed by Lenin in Imperialism: The Highest Stage of capitalism. World-system theory argues that globalized capitalism has created a core of modern industrialized countries which exploit a periphery of exploited "Third World" countries. These ideas were developed by the Latin American Dependency School. "Neo-Marxist" or "New Marxist" approaches have return to the writings of Karl Marx for their inspiration. Key "New Marxists" include

Justin Rosenberg and Benno Teschke. Marxist approaches have enjoyed a renaissance since the collapse of communism in Eastern Europe.

Criticisms of Marxists approaches to international relations theory include the narrow focus on material and economic aspects of life.

Feminism

Feminist approaches to international relations became popular in the early 1990s. Such approaches emphasises that women's experiences continue to be excluded from the study of international relations. International Relations Feminists who argue that gender relations are integral to international relations focus on the role of diplomatic wives and marital relationship that facilitate sex trafficking. Early feminist IR approaches were part of the "Third Great Debate" between positivists and post-positivists. They argued against what they saw as the positivism and state-centrism of mainstream international relations. Christian Reus-Smit argues that these approaches did not describe what a feminist perspective on world politics would look like.

The feminist international relations scholar Jacqui True differentiates between empirical feminism, analytical feminism and normative feminism. Empirical feminism sees women and gender relations as empirical aspects of international relations. It is argued that mainstream international relations emphasis on anarchy and statecraft mean that areas of study that make the reproduction of the state system possible are marginalized. Analytical feminism claims that the theoretical framework of international relations has a gender bias. Here gender refers not to the "biological" differences between men and women but the social constructs of masculine and feminine identity. It is claimed that in mainstream international relations masculinity is associated with objectivity. Analytical feminists would see neo-realisms dislike of domestic explanations for explaining interstate behaviour as an example of this bias. Normative feminist sees theorizing as part of an agenda for change.

Criticisms of feminist international relations theory include its portrayal of third world women.

English School

The 'English School' of international relations theory, also known as International Society, Liberal Realism, Rationalism or the British institutionalists, maintains that there is a 'society of states' at the international level, despite the condition of 'anarchy' (literally the lack of a ruler or world state). Despite being called the English School many of the academics from this school were neither English or from the United Kingdom. A great deal of the work of the English School concerns the examination of traditions of past international theory, casting it, as Martin Wight did in his 1950s-era lectures at the London School of Economics, into three divisions: 1. Realist or Hobbesian (after Thomas Hobbes), 2. Rationalist (or Grotian, after Hugo Grotius), 3. Revolutionist (or Kantian, after Immanuel Kant).In broad terms, the English School itself has supported the

rationalist or Grotian tradition, seeking a middle way (or via media) between the 'power politics' of realism and the 'utopianism' of revolutionism. The English School reject behavioralist approaches to international relations theory.

Functionalism

Functionalism is a theory of international relations that arose principally from the experience of European integration. Rather than the self-interest that realists see as a motivating factor, functionalists focus on common interests shared by states. Integration develops its own internal dynamic: as states integrate in limited functional or technical areas, they increasingly find that momentum for further rounds of integration in related areas. This "invisible hand" of integration phenomenon is termed "spill-over." Although integration can be resisted, it becomes harder to stop integration's reach as it progresses. This usage, and the usage in functionalism in international relations, is the less commonly used meaning of the term functionalism.

More commonly, however, functionalism is a term used to describe an argument which explains phenomena as functions of a system rather than an actor or actors. Immanuel Wallerstein employed a functionalist theory when he argued that the Westphalian international political system arose to secure and protect the developing international capitalist system. His theory is called "functionalist" because it says that an event was a function of the preferences of a system and not the preferences of an agent. Functionalism is different from structural or realist arguments in that while both look to broader, structural causes, realists (and structuralists more broadly) say that the structure gives incentives to agents, while functionalists attribute causal power to the system itself, bypassing agents entirely.

State Cartel Theory

State cartel theory in international relations is derived from an old institutional theory of economics, from the theory of private or enterprise cartels. It has a German background, because Germany was formerly the land of highest developed economic cartels and the motherland of classical cartel theory. State cartel theory uses a mix of methods ranging from positivist data evaluation to critical socioeconomic analyses or reflexive methods like criticism of thinking or ideology. Among the other theories of International Relations, State cartel theory has most in common with Functionalism in international relations. A bit more than the latter, state cartel theory has its focus on a theory of international organizations.

Post-structuralism

Post-structuralism differs from most other approaches to international politics because it does not see itself as a theory, school or paradigm which produces a single account of the subject matter. Instead, post-structuralism is an approach, attitude, or ethos that pursues critique in particular way. Post-structuralism sees critique as an inherently positive exercise that establishes the conditions of possibility for pursuing alternatives.

Postcolonialism

Postcolonial International relations scholarship posits a critical theory approach to International relations (IR), and is a non-mainstream area of international relations scholarship. Post-colonialism focuses on the persistence of colonial forms of power and the continuing existence of racism in world politics.

Chapter- 4

Social Constructivism

Social constructivism is a sociological theory of knowledge that applies the general philosophical constructionism into social settings, wherein groups construct knowledge for one another, collaboratively creating a small culture of shared artifacts with shared meanings. When one is immersed within a culture of this sort, one is learning all the time about how to be a part of that culture on many levels. Its origins are largely attributed to Lev Vygotsky.

Social constructivism and social constructionism

Social constructivism is closely related to social constructionism in the sense that people are working together to construct artifacts. However, there is an important difference: *social constructionism* focuses on the artefacts that are created through the social interactions of a group, while *social constructivism* focuses on an individual's learning that takes place because of their interactions in a group.

A very simple example is an object like a cup. The object can be used for many things, but its shape does suggest some 'knowledge' about carrying liquids. A more complex example is an online course - not only do the 'shapes' of the software tools indicate certain things about the way online courses should work, but the activities and texts produced within the group as a whole will help shape how each person behaves within that group.

Social constructivism and education

Social constructivism has been studied by many educational psychologists, who are concerned with its implications for teaching and learning. Constructivism forms one of the major theories (behaviourism, social learning, constructivism and social constructivism) of child development, arising from the work of Jean Piaget's theory of cognitive development. Piaget's stage theory (describing four successive stages of development) also became known as constructivism, because he believed children needed to construct an understanding of the world for themselves. Social constructivism extends constructivism by incorporating the role of other actors and culture in development. In this sense it can also be contrasted with social learning theory by stressing interaction over observation.

Vygotsky's contributions reside in Mind in Society (1930, 1978) and Thought and Language (1934, 1986). Vygotsky independently came to the same conclusions as Piaget regarding the constructive nature of development.

An instructional strategy grounded in social constructivism that is an area of active research is computer-supported collaborative learning (CSCL). This strategy gives students opportunities to practice 21st-century skills in communication, knowledge sharing, critical thinking and use of relevant technologies found in the workplace.

Additionally, studies on increasing the use of student discussion in the classroom both support and are grounded in theories of social constructivism. There are a full range of advantages that result from the implementation of discussion in the classroom. Participation in group discussion allows students to generalize and transfer their knowledge of classroom learning and builds a strong foundation for communicating ideas orally (Reznitskaya, Anderson & Kuo, 2007). Many studies argue that discussion plays a vital role in increasing student ability to test their ideas, synthesize the ideas of others, and build deeper understanding of what they are learning (Corden, 2001; Nystrand, 1996; Reznitskaya, Anderson & Kuo, 2007; Weber, Maher, Powell & Lee, 2008). Large and small group discussion also affords students opportunities to exercise self-regulation, self-determination, and a desire to persevere with tasks (Corden, 2001; Matsumara, Slater & Crosson, 2008). Additionally, discussion increases student motivation, collaborative skills, and the ability to problem solve (Dyson, 2004; Matsumara, Slater & Crosson, 2008; Nystrand, 1996). Increasing students' opportunity to talk with one another and discuss their ideas increases their ability to support their thinking, develop reasoning skills, and to argue their opinions persuasively and respectfully (Reznitskaya, Anderson & Kuo, 2007). Furthermore, the feeling of community and collaboration in classrooms increases through offering more chances for students to talk together (Barab, Dodge, Thomas, Jackson, & Tuzun, 2007; Hale & City, 2002; Weber, Maher, Powell & Lee, 2008).

Given the advantages that result from discussion, it is surprising that it is not used more often. Studies have found that students are not regularly accustomed to participating in academic discourse (Corden, 2001; Nystrand, 1996). Nystrand (1996) argues that teachers rarely choose classroom discussion as an instructional format. The results of Nystrand's (1996) three year study focusing on 2400 students in 60 different classrooms indicate that the typical classroom teacher spends under three minutes an hour allowing students to talk about ideas with one another and the teacher (Nystrand, 1996). Even within those three minutes of discussion, most talk is not true discussion because it depends upon teacher directed questions with predetermined answers (Corden, 2001; Nystrand, 1996). Multiple observations indicate that students in low socioeconomic schools and lower track classrooms are allowed even fewer opportunities for discussion (Corden, 2001; Nystrand, 1996; Weber, Maher, Powell & Lee, 2008). Teachers who teach as if they value what their students think create learners. Discussion and interactive discourse promote learning because they afford students the opportunity to use language as a demonstration of their independent thoughts. Discussion elicits sustained responses from students that encourage meaning making through negotiating with the ideas of

others. This type of learning “promotes retention and in-depth processing associated with the cognitive manipulation of information” (Nystrand, pg. 28).

Chapter- 5

Constructivism (art)

Constructivism was an artistic and architectural philosophy that originated in Russia beginning 1919, which was a rejection of the idea of autonomous art in favour of art as a practice for social purposes. Constructivism had a great effect on the modern art movement of the 20th century, influencing major trends such as Bauhaus and the De Stijl movement. Its influence was pervasive, with major impacts upon architecture, graphic and industrial design, theatre, film, dance, fashion and to some extent music.

Beginnings

Photograph of the first Constructivist Exhibition, 1921

The term *Construction Art* was first used as a derisive term by Kazimir Malevich to describe the work of Alexander Rodchenko during 1917. Constructivism first appears as a positive term in Naum Gabo's *Realistic Manifesto* of 1920. Alexei Gan used the word as the title of his book *Constructivism*, which was printed during 1922. Constructivism was a post-World War I development of Russian Futurism, and particularly of the 'corner-counter reliefs' of Vladimir Tatlin, which had been exhibited during 1915. The term itself would be invented by the sculptors Antoine Pevsner and Naum Gabo, who developed an industrial, angular style of work, while its geometric abstraction owed something to the Suprematism of Kasimir Malevich. IZO, the Commissariat's artistic bureau, was managed during the Russian Civil War mainly by Futurists, who published the journal *Art of the Commune*. Constructivism in Moscow was represented by VKhUTEMAS, the school for art and design established during 1919. Gabo later stated that teaching at the school emphasized political and ideological discussion rather than art-making. Despite this, Gabo himself designed a radio transmitter during 1920 (and would submit a design to the Palace of the Soviets competition during 1930).

Constructivism as theory and practice was derived largely from a series of debates at INKhUK (Institute of Artistic Culture) in Moscow, from 1920–22. After deposing its first chairman, Wassily Kandinsky, for his 'mysticism', The First Working Group of Constructivists (including Liubov Popova, Alexander Vesnin, Rodchenko, Varvara Stepanova, and the theorists Alexei Gan, Boris Arvatov and Osip Brik) would develop a definition of Constructivism as the combination of *faktura*: the particular material properties of an object, and *tektonika*, its spatial presence. Initially the Constructivists worked on three-dimensional constructions as a means of participating with industry: the OBMOKhU (Society of Young Artists) exhibition showed these three dimensional compositions, by Rodchenko, Stepanova, Karl Ioganson and the Stenberg Brothers. Later the definition would be extended to designs for two-dimensional works such as books or posters, with *montage* and *factography* becoming important concepts.

Art in the service of the Revolution

Agitprop poster by Mayakovsky

As much as involving itself in designs for industry, the Constructivists worked on public festivals and street designs for the post-October revolution Bolshevik government. Perhaps the most famous of these was in Vitebsk, where Malevich's UNOVIS Group painted propaganda plaques and buildings (the best known being El Lissitzky's poster *Beat the Whites with the Red Wedge* (1919)). Inspired by Vladimir Mayakovsky's declaration 'the streets our brushes, the squares our palettes', artists and designers participated with public life during the Civil War. A striking instance was the proposed festival for the Comintern congress during 1921 by Alexander Vesnin and Liubov Popova, which resembled the constructions of the OBMOKhU exhibition as well as their work for the theatre. There was a great deal of overlap during this period between Constructivism and Proletkult, the ideas of which concerning the need to create an entirely new culture struck a chord with the Constructivists. In addition some Constructivists were heavily involved in the 'ROSTA Windows', a Bolshevik public

information campaign of around 1920. Some of the most famous of these were by the poet-painter Vladimir Mayakovsky and Vladimir Lebedev.

The constructivists tried to create works that would make the viewer an active viewer of the artwork. In this it had similarities with the Russian Formalists' theory of 'making strange', and accordingly their main theorist Viktor Shklovsky worked closely with the Constructivists, as did other formalists like Osip Brik. These theories were tested in theatre, particularly with the work of Vsevolod Meyerhold, who had established what he called 'October in the theatre'. Meyerhold developed a 'biomechanical' acting style, which was influenced both by the circus and by the 'scientific management' theories of Frederick Winslow Taylor. Meanwhile the stage sets by the likes of Vesnin, Popova and Stepanova tested Constructivist spatial ideas in a public form. A more populist version of this was developed by Alexander Tairov, with stage sets by Aleksandra Ekster and the Stenberg Brothers. These ideas would influence German directors like Bertolt Brecht and Erwin Piscator, as well as the early Soviet cinema.

Tatlin, 'Construction Art' and Productivism

The canonical work of Constructivism was Vladimir Tatlin's proposal for the Monument to the Third International (1919) which combined a machine aesthetic with dynamic components celebrating technology such as searchlights and projection screens. Gabo publicly criticized Tatlin's design saying *Either create functional houses and bridges or create pure art, not both.* This had already caused a major controversy in the Moscow group during 1920 when Gabo and Pevsner's *Realistic Manifesto* was published. This was opposed to the utilitarian and adaptable version of Constructivism used by Tatlin and Rodchenko. Tatlin's work was immediately termed by artists in Germany as a revolution of art: a 1920 photograph shows George Grosz and John Heartfield holding a placard saying 'Art is Dead – Long Live Tatlin's Machine Art', while the designs for the tower were published in Bruno Taut's magazine *Fruhlicht*.

Tatlin's tower started a period of exchange of ideas between Moscow and Berlin, something reinforced by El Lissitzky and Ilya Ehrenburg's Soviet-German magazine *Veshch-Gegenstand-Objet* which spread the idea of 'Construction art', as did the Constructivist exhibits at the 1922 *Russische Ausstellung* in Berlin, organised by Lissitzky. A 'Constructivist international' was formed, which met with Dadaists and De Stijl artists in Germany during 1922. Participants with this short-lived international included Lissitzky, Hans Richter, and Laszlo Moholy-Nagy. However the idea of 'art' was becoming anathema to the Russian Constructivists: the INKhUK debates of 1920–22 had culminated in the theory of Productivism propounded by Osip Brik and others, which demanded direct participation with industry and the end of easel painting. Tatlin was one of the first to attempt to transfer his talents to industrial production, with his designs for an economical stove, for workers' overalls and for furniture. The Utopian element in Constructivism was maintained by his 'letatlin', a flying machine which he worked on until the 1930s.

Constructivism and consumerism

During 1921, the New Economic Policy was established in the Soviet Union, which reintroduced a limited state capitalism in the Soviet economy. Rodchenko, Stepanova, and others made advertising for the co-operatives that were now in competition with commercial businesses. The poet-artist Vladimir Mayakovsky and Rodchenko worked together and called themselves "*advertising constructors*". Together they designed eye-catching images featuring bright colours, geometric shapes, and bold lettering. The lettering of most of these designs was intended to create a reaction, and function emotionally – most were designed for the state-owned department store Mosselprom in Moscow, for pacifiers, cooking oil, beer and other quotidian products, with Mayakovsky claiming that his 'nowhere else but Mosselprom' verse was one of the best he ever wrote.

An advertising construction

Additionally, several artists tried to work with clothes design with varying success: Varvara Stepanova designed dresses with bright, geometric patterns that were mass-produced, although workers' overalls by Tatlin and Rodchenko never achieved this and remained prototypes. The painter and designer Lyubov Popova designed a kind of Constructivist flapper dress before her early death during 1924, the plans for which were published in the journal LEF. In these works Constructivists showed a willingness to involve themselves in fashion and the mass market, which they tried to balance with their Communist beliefs.

LEF and Constructivist cinema

The Soviet Constructivists organised themselves in the 1920s into the 'Left Front of the Arts', who produced the influential journal LEF, (which had two series, from 1923–5 and from 1927–9 as *New LEF*). LEF was dedicated to maintaining protest against the critiques of the incipient Socialist Realism, and the possibility of a capitalist restoration, with the journal being particularly scathing about the 'NEPmen', the capitalists of the period. For LEF the new medium of cinema was more important than the easel painting and traditional narratives that elements of the Communist Party were trying to revive then. Important Constructivists were very involved with cinema, with Mayakovsky acting in the movie *The Young Lady and the Hooligan* (1919), Rodchenko's designs for the intertitles and animated sequences of Dziga Vertov's movie *Kino Eye* (1924), and

Aleksandra Ekster designed the sets and costumes for the science fiction movie *Aelita* (1924).

The Productivist theorists Osip Brik and Sergei Tretyakov also wrote screenplays and intertitles, for movies such as Vsevolod Pudovkin's *Storm over Asia* (1928) or Victor Turin's *Turksib* (1929). The moviemakers and LEF contributors Dziga Vertov and Sergei Eisenstein as well as the documentarist Esfir Shub also regarded their fast-cut, montage style of moviemaking as Constructivist. The early Eccentrist movies of Grigori Kozintsev and Leonid Trauberg (*The New Babylon*, *Alone*) had similarly avant-garde intentions, as well as a fixation on America which was characteristic of the philosophy, with its praise of slapstick-comedy actors like Charlie Chaplin or Buster Keaton, as well as of Fordist mass production. Like the photomontages and designs of Constructivism, early Soviet cinema concentrated on creating an agitational effect by montage and 'making strange'.

Photography and photomontage

The Constructivists were early developers of the techniques of photomontage. Gustav Klutsis' 'Dynamic City' and 'Lenin and Electrification' (1919–20) are the first examples of this method of montage, which had in common with Dadaism the collaging together of news photographs and painted sections. However Constructivist montages would be less 'destructive' than those of Dadaism. Perhaps the most famous of these montages was Rodchenko's illustrations of the Mayakovsky poem *About This*.

LEF also helped popularise a distinctive style of photography, involving jagged angles and contrasts and an abstract use of light, which paralleled the work of Laszlo Moholy-Nagy in Germany: the major practitioners of this included, along with Rodchenko, Boris Ignatovich and Max Penson, among others. This also shared many characteristics with the early documentary philosophy.

Constructivist graphic design

The book designs of Rodchenko, El Lissitzky and others such as Solomon Telingater and Anton Lavinsky were a major inspiration for the work of radical designers in the West, particularly Jan Tschichold. Many Constructivists worked on the design of posters for everything from cinema to political propaganda: the former represented best by the brightly coloured, geometric posters of the Stenberg brothers (Georgii and Vladimir Stenberg), and the latter by the agitational photomontage work of Gustav Klutsis and Valentina Kulagina.

The Constructivists' main early political patron was Leon Trotsky, and it began to be regarded with suspicion after the expulsion of Trotsky and the Left Opposition during 1927-8. The Communist Party would gradually favour realist art during the course of the 1920s (as early as 1918 *Pravda* had complained that government funds were being used to buy works by untried artists). However it was not until about 1934 that the counter-doctrine of Socialist Realism was instituted in Constructivism's place. Many

Constructivists continued to produce avantgarde work in the service of the state, such as Lissitzky, Rodchenko and Stepanova's designs for the magazine *USSR In Construction*.

Legacy

A number of Constructivists would teach or lecture at the Bauhaus schools in Germany, and some of the VKhUTEMAS teaching methods were adopted and developed there. Gabo established a version of Constructivism in England during the 1930s and 1940s that was adopted by architects, designers and artists after World War II, and John McHale. Joaquin Torres Garcia and Manuel Rendón were instrumental in spreading Constructivism throughout Europe and Latin America. Constructivism had an effect on the modern masters of Latin America such as: Carlos Merida, Enrique Tábara, Aníbal Villacís, Theo Constanté, Oswaldo Viteri, Estuardo Maldonado, Luis Molinari, Carlos Catasse, João Batista Vilanova Artigas and Oscar Niemeyer, to name just a few. There have also been disciples in Australia, the painter George Johnson being the best known.

During the 1980s graphic designer Neville Brody used styles based on Constructivist posters that initiated a revival of popular interest. Also during the 1980s designer Ian Anderson initiated The Designers Republic, a successful and influential design company which uses constructivist principles.

So-called Deconstructivist architecture was developed by architects Zaha Hadid, Rem Koolhaas and others during the late 20th and early 21st centuries. Zaha Hadid by her sketches and drawings of abstract triangles and rectangles evokes the aesthetic of constructivism. Though similar formally, the socialist political connotations of Russian constructivism are deemphasized by Hadid's deconstructivism. Rem Koolhaas' projects revive another aspect of constructivism. The scaffold and crane-like structures represented by many constructivist architects are used for the finished forms of his designs and buildings.

Cinematic influences include Bulgarian born animator Theodore Ushev's 2006 brief movie *Tower Bawher*. Inspired by Russian constructivist art, the animated short features visual references to artists of the era including Vertov, Stenberg, Rodchenko, Lissitsky and Popova.

Chapter- 6

Constructivist Teaching Methods

Constructivist teaching is based on constructivist learning theory. This theoretical framework holds that learning always builds upon knowledge that a student already knows; this prior knowledge is called a schema. Because all learning is filtered through pre-existing schemata, constructivists suggest that learning is more effective when a student is actively engaged in the learning process rather than attempting to receive knowledge passively. A wide variety of methods claim to be based on constructivist learning theory. Most of these methods rely on some form of guided discovery where the teacher avoids most direct instruction and attempts to lead the student through questions and activities to discover, discuss, appreciate and verbalize the new knowledge.

History

Constructivist teaching methods are based on constructivist learning theory. Along with John Dewey, Jean Piaget researched childhood development and education. Their theories are now encompassed in the broader movement of progressive education.

Constructivist learning theory says that all knowledge is constructed from a base of prior knowledge. Children are not a blank slate and knowledge cannot be imparted without the child making sense of it according to his or her current conceptions. Therefore children learn best when they are allowed to construct a personal understanding based on experiencing things and reflecting on those experiences.

Constructivist teaching strategies

Characteristics of Constructivist Teaching

One of the primary goals of using constructivist teaching is that students learn how to learn by giving them the training to take initiative for their own learning experiences.

According to Audrey Gray, the characteristics of a constructivist classroom are as follows:

- the learners are actively involved
- the environment is democratic
- the activities are interactive and student-centered

- the teacher facilitates a process of learning in which students are encouraged to be responsible and autonomous

Examples of constructivist activities

Furthermore, in the constructivist classroom, students work primarily in groups and learning and knowledge are interactive and dynamic. There is a great focus and emphasis on social and communication skills, as well as collaboration and exchange of ideas. This is contrary to the traditional classroom in which students work primarily alone, learning is achieved through repetition, and the subjects are strictly adhered to and are guided by a textbook. Some activities encouraged in constructivist classrooms are:

- Experimentation: students individually perform an experiment and then come together as a class to discuss the results.
- Research projects: students research a topic and can present their findings to the class.
- Field trips. This allows students to put the concepts and ideas discussed in class in a real-world context. Field trips would often be followed by class discussions.
- Films. These provide visual context and thus bring another sense into the learning experience.
- Class discussions. This technique is used in all of the methods described above. It is one of the most important distinctions of constructivist teaching methods.

Constructivist approaches can also be used in online learning. For example, tools such as discussion forums and blogs can enable learners to actively construct knowledge.

Because existing knowledge schemata are explicitly acknowledged as a starting point for new learning, constructivist approaches tend to validate individual and cultural differences and diversity.

Role of teachers

In the constructivist classroom, the teacher's role is to prompt and facilitate discussion. Thus, the teacher's main focus should be on guiding students by asking questions that will lead them to develop their own conclusions on the subject.

David Jonassen identified three major roles for facilitators to support students in constructivist learning environments:

- Modeling
- Coaching
- Scaffolding

Constructivist Learning Environments (CLEs)

Jonassen has proposed a model for developing constructivist learning environments (CLEs) around a specific learning goal. This goal may take one of several forms, from least to most complex:

- Question or issue
- Case study
- Long-term Project
- Problem (multiple cases and projects integrated at the curriculum level)

Jonassen recommends making the learning goals engaging and relevant but not overly structured.

In CLEs, learning is driven by the problem to be solved; students learn content and theory in order to solve the problem. This is different from traditional objectivist teaching where the theory would be presented first and problems would be used afterwards to practice theory.

Depending on students' prior experiences, related cases and scaffolding may be necessary for support. Instructors also need to provide an authentic context for tasks, plus information resources, cognitive tools, and collaborative tools.

Constructivist assessment

Traditionally, assessment in the classrooms is based on testing. In this style, it is important for the student to produce the correct answers. However, in constructivist teaching, the process of gaining knowledge is viewed as being just as important as the product. Thus, assessment is based not only on tests, but also on observation of the student, the student's work, and the student's points of view. Some assessment strategies include:

- Oral discussions. The teacher presents students with a "focus" question and allows an open discussion on the topic.
- KWL(H) Chart (What we **know**, What we **want** to know, What we have **learned**, **How** we know it). This technique can be used throughout the course of study for a particular topic, but is also a good assessment technique as it shows the teacher the progress of the student throughout the course of study.
- Mind Mapping. In this activity, students list and categorize the concepts and ideas relating to a topic.
- Hands-on activities. These encourage students to manipulate their environments or a particular learning tool. Teachers can use a checklist and observation to assess student success with the particular material.
- Pre-testing. This allows a teacher to determine what knowledge students bring to a new topic and thus will be helpful in directing the course of study.

An example of a lesson taught with a Constructivist background

A good example of a lesson being taught in a constructivist way, with the teacher mediating learning rather than directly teaching the class is shown by the example of Faraday's candle. There are various forms of this lesson, but all are developed from the Christmas lectures Faraday gave on the functioning of candles. In open constructivist lessons using these lectures as a basis, students are encouraged to discover for themselves how candles work. They do this first by making simple observations, from which they later build ideas and hypotheses which they then go on to test. The teachers acts to encourage this learning. If successful, students can use this lesson to understand the components of combustion, an important chemistry topic.

Constructivism for Adults

Constructivist philosophy has a long history of application in education programs for young children, but is used less frequently in adult learning environments. As humans develop, there are qualitative changes in their ability to think logically about experiences, but the processes by which learning occur, cognitive adaptation and social mediation, are believed to be continuous or remain the same throughout the life. At the heart of constructivist philosophy is the belief that knowledge is not given but gained through real experiences that have purpose and meaning to the learner, and the exchange of perspectives about the experience with others (Piaget & Inhelder, 1969; Vygotsky,1978).

Learning environments for adults based on constructivist philosophy include opportunities for students to make meaningful connections between new material and previous experience, through discovery. One of the simplest ways to do this is asking open-ended questions. Open-ended questions such as “Tell me about a time when….” or “How might this information be useful to you?” causes learners to think about how new information may relate to their own experience. Student responses to such questions are opportunities for experiencing the perspectives of others. For these questions to be effective it is critical that instructors focus on teaching content that is useful for participants. The importance of using these types of strategies with adults contributes to what Bain(2004 p. 4) noted as critical learning environments where instructors “embed” the skills they are teaching in “authentic tasks that will arouse curiosity, challenge students to rethink assumptions and examine their mental modes of reality”.

Such approaches emphasize that learning is not an "all or nothing" process but that students learn the new information that is presented to them by building upon knowledge that they already possess. It is therefore important that teachers constantly assess the knowledge their students have gained to make sure that the students' perceptions of the new knowledge are what the teacher had intended. Teachers will find that since the students build upon already existing knowledge, when they are called upon to retrieve the new information, they may make errors. It is known as reconstruction error when we fill in the gaps of our understanding with logical, though incorrect, thoughts. Teachers need to catch and try to correct these errors, though it is inevitable that some reconstruction error will continue to occur because of our innate retrieval limitations.

In most pedagogies based on constructivism, the teacher's role is not only to observe and assess but to also engage with the students while they are completing activities, wondering aloud and posing questions to the students for promotion of reasoning (DeVries et al., 2002). (ex: I wonder why the water does not spill over the edge of the full cup?) Teachers also intervene when there are conflicts that arise; however, they simply facilitate the students' resolutions and self-regulation, with an emphasis on the conflict being the students' and that they must figure things out for themselves. For example, promotion of literacy is accomplished by integrating the need to read and write throughout individual activities within print-rich classrooms. The teacher, after reading a story, encourages the students to write or draw stories of their own, or by having the students reenact a story that they may know well, both activities encourage the students to *conceive themselves* as reader and writers.

Arguments against constructivist teaching techniques

Critics have voiced the following arguments against constructivist based teaching instruction:

- A group of cognitive scientists has also questioned the central claims of constructivism, saying that they are either misleading or contradict known findings.

- One possible deterrent for this teaching method is that, due to the emphasis on group work, the ideas of the more active students may dominate the group's conclusions.

While proponents of constructivism argue that constructivist students perform better than their peers when tested on higher-order reasoning, the critics of constructivism argue that this teaching technique forces students to "reinvent the wheel." Supporters counter that "Students do not reinvent the wheel but, rather, attempt to understand how it turns, how it functions." Proponents argue that students — especially elementary school-aged children — are naturally curious about the world, and giving them the tools to explore it in a guided manner will serve to give them a stronger understanding of it.

Mayer (2004) developed a literature review spanning fifty years and concluded "The research in this brief review shows that the formula constructivism = hands-on activity is a formula for educational disaster." His argument is that active learning is often suggested by those subscribing to this philosophy. In developing this instruction these educators produce materials that require learning to be behaviorally active and not be "cognitively active." That is, although they are engaged in activity, they may not be learning (Sweller, 1988). Mayer recommends using guided discovery, a mix of direct instruction and hands-on activity, rather than pure discovery: "In many ways, guided discovery appears to offer the best method for promoting constructivist learning."

Kirchner et al. (2006) agree with the basic premise of constructivism, that learners construct knowledge, but are concerned with the instructional design recommendations of

this theoretical framework. "The constructivist description of learning is accurate, but the instructional consequences suggested by constructivists do not necessarily follow." (Kirschner, Sweller, and Clark, 2006, p. 78). Specifically, they say instructors often design unguided instruction that relies on the learner to "discover or construct essential information for themselves" (Kirchner et al., 2006, p75).

For this reason they state that it "is easy to agree with Mayer's (2004) recommendation that we "move educational reform efforts from the fuzzy and nonproductive world of ideology—which sometimes hides under the various banners of constructivism—to the sharp and productive world of theory- based research on how people learn" (p. 18). Finally Kirschner, Sweller, and Clark (2006) cite Mayer to conclude fifty years of empirical results do not support unguided instruction.

Another important consideration in evaluating the potential benefits/limitations of constructivist teaching approach is to consider the large number of varied personal characteristics as well as prevalence of learning problems in children today. For example, in a solely constructivist approach was employed in a classroom of you children then a significant number of children, for example say with Attention Deficit/Hyperactivity Disorder, might not be able to focus on their perceptions of learning experiences long enough to build a knowledge base from the event. In other words, constructivist theory is biased to students who desire to learn more and are capable of focusing attention to the learning process independently. A mixed approach that incorporates components of constructivist learning along with other approaches, including more guided teaching strategies, would better meet the learning needs of the majority of students in a classroom by accounting for differences between learning styles and capacities.

Specific approaches

Specific approaches to education that are based on constructivism include:

- Constructionism
    - An approach to learning developed by Seymour Papert and his colleagues at MIT in Cambridge, Massachusetts. Papert had worked with Piaget at the latter's Institute in Geneva. Papert eventually called his approach "constructionism." It included everything associated with Piaget's constructivism, but went beyond it to assert that constructivist learning happens especially well when people are engaged in constructing a product, something external to themselves such as a sand castle, a machine, a computer program or a book. This approach is greatly facilitated by the ready availability of powerful 'constructing' applications on personal computers. Promoters of the use of computers in education see an increasing need for students to develop skills in Multimedia literacy in order to use these tools in constructivist learning.
- Reciprocal Learning
    - Two teach each other.
- Procedural Facilitations for Writing

- Critical Exploration (Duckworth, 2006) The two components of critical exploration are curriculum development and pedagogy. In this method teachers find ways to encourage their students to explore the subject matter and express their thoughts on the material(Duckworth).
- Cognitively Guided Instruction
    - A research and teacher professional development program in elementary mathematics created by Thomas P. Carpenter, Elizabeth Fennema, and their colleagues at the University of Wisconsin-Madison. Its major premise is that teachers can use students' informal strategies (i.e., strategies students construct based on their understanding of everyday situations, such as losing marbles or picking flowers) as a primary basis for teaching mathematics in the elementary grades.
- Inquiry-based learning
- Problem-based learning
- Cognitive apprenticeships
- Various methods involving collaboration or group work
- Cooperative learning (reciprocal questioning, Jigsaw Classroom, structured controversies)
- Anchored Instruction (Bransford et al.)
    - Problems and approaches to solutions are embedded in a narrative environment.
- Cognitive Apprenticeship (Collins et al.)
    - Learning is achieved by integration into a specific implicit and explicit culture of knowledge.
        - Six features of cognitive apprenticeships: modeling of the performance, support through coaching/tutoring, scaffolding, students articulate knowledge, reflection on progress, exploration of new applications. (Woolfolk, 2010)
- Cognitive Flexibility (Sprio et al.)
    - A constructivist approach to curriculum design, in which the learning activities spelled out in the intended learning outcomes are built into the teaching methods and assessment tasks.
- The Silent Way
    - A constructivist approach to foreign language teaching and learning developed by Caleb Gattegno who worked with Piaget before WWII and in the late 1940s.

Chapter- 7

Constructivism (mathematics)

In the philosophy of mathematics, **constructivism** asserts that it is necessary to find (or "construct") a mathematical object to prove that it exists. When one assumes that an object does not exist and derives a contradiction from that assumption, one still has not found the object and therefore not proved its existence, according to constructivists. This viewpoint involves a verificational interpretation of the existence quantifier, which is at odds with its classical interpretation.

There are many forms of constructivism. These include the program of intuitionism founded by Brouwer, the finitism of Hilbert and Bernays, the constructive recursive mathematics of Shanin and Markov, and Bishop's program of constructive analysis. Constructivism also includes the study of constructive set theories such as IZF and the study of topos theory.

Constructivism is often identified with intuitionism, although intuitionism is only one constructivist program. Intuitionism maintains that the foundations of mathematics lie in the individual mathematician's intuition, thereby making mathematics into an intrinsically subjective activity. Other forms of constructivism are not based on this viewpoint of intuition, and are compatible with an objective viewpoint on mathematics.

Constructive mathematics

Much constructive mathematics uses intuitionistic logic, which is essentially classical logic without the law of the excluded middle. This is not to say that the law of the excluded middle is denied entirely; special cases of the law will be provable. It is just that the general law is not assumed as an axiom. (The law of non-contradiction, on the other hand, is still valid.)

For instance, in Heyting arithmetic, one can prove that for any proposition *p* which *does not contain quantifiers*, $\forall x, y, z, \ldots \in \mathbb{N} : p \vee \neg p$is a theorem (where *x*, *y*, *z* ... are the free variables in the proposition *p*). In this sense, propositions restricted to the finite are still regarded as being either true or false, as they are in classical mathematics, but this bivalence does not extend to propositions which refer to infinite collections.

In fact, L.E.J. Brouwer, founder of the intuitionist school, viewed the law of the excluded middle as abstracted from finite experience, and then applied to the infinite without justification. For instance, Goldbach's conjecture is the assertion that every even number (greater than 2) is the sum of two prime numbers. It is possible to test for any particular even number whether or not it is the sum of two primes (for instance by exhaustive search), so any one of them is either the sum of two primes or it is not. And so far, every one thus tested has in fact been the sum of two primes.

But there is no known proof that all of them are so, nor any known proof that not all of them are so. Thus to Brouwer, we are not justified in asserting "either Goldbach's conjecture is true, or it is not." And while the conjecture may one day be solved, the argument applies to similar unsolved problems; to Brouwer, the law of the excluded middle was tantamount to assuming that *every* mathematical problem has a solution.

With the omission of the law of the excluded middle as an axiom, the remaining logical system has an existence property which classical logic does not: whenever $\exists_{x \in X} P(x)$ is proven constructively, then in fact $P(a)$ is proven constructively for (at least) one particular $a \in X$, often called a witness. Thus the proof of the existence of a mathematical object is tied to the possibility of its construction.

Example from real analysis

In classical real analysis, one way to define a real number is as an equivalence class of Cauchy sequences of rational numbers.

In constructive mathematics, one way to construct a real number is as a function f that takes a positive integer n and outputs a rational $f(n)$, together with a function g that takes a positive integer n and outputs a positive integer $g(n)$ such that

$$\forall n \ \forall i, j \geq g(n) \quad |f(i) - f(j)| \leq \frac{1}{n}$$

so that as n increases, the values of $f(n)$ get closer and closer together. We can use f and g together to compute as close a rational approximation as we like to the real number they represent.

Under this definition, a simple representation of the real number e is:

$$f(n) = \sum_{i=0}^{n} \frac{1}{i!}, \quad g(n) = n.$$

This definition corresponds to the classical definition using Cauchy sequences, except with a constructive twist: for a classical Cauchy sequence, it is required that, for any given distance, there exists (in a classical sense) a member in the sequence after which all members are closer together than that distance. In the constructive version, it is required

that, for any given distance, it is possible to actually specify a point in the sequence where this happens (this required specification is often called the modulus of convergence). In fact, the standard constructive interpretation of the mathematical statement

$$\forall n : \exists m : \forall i, j \geq m : |f(i) - f(j)| \leq \frac{1}{n}$$

is precisely the existence of the function computing the modulus of convergence. Thus the difference between the two definitions of real numbers can be thought of as the difference in the interpretation of the statement "for all... there exists..."

This then opens the question as to what sort of function from a countable set to a countable set, such as *f* and *g* above, can actually be constructed. Different versions of constructivism diverge on this point. Constructions can be defined as broadly as free choice sequences, which is the intuitionistic view, or as narrowly as algorithms (or more technically, the computable functions), or even left unspecified. If, for instance, the algorithmic view is taken, then the reals as constructed here are essentially what classically would be called the computable numbers.

Cardinality

To take the algorithmic interpretation above would seem at odds with classical notions of cardinality. By enumerating algorithms, we can show classically that the computable numbers are countable. And yet Cantor's diagonal argument shows that real numbers have higher cardinality. Furthermore the diagonal argument seems perfectly constructive. To identify the real numbers with the computable numbers would then be a contradiction.

And in fact, Cantor's diagonal argument *is* constructive, in the sense that given a bijection between the real numbers and natural numbers, one constructs a real number which doesn't fit, and thereby proves a contradiction. We can indeed enumerate algorithms to construct a function *T*, about which we initially assume that it is a function from the natural numbers onto the reals. But, to each algorithm, there may or may not correspond a real number, as the algorithm may fail to satisfy the constraints, or even be non-terminating (*T* is a partial function), so this fails to produce the required bijection. In short, one who takes the view that real numbers are effectively computable interprets Cantor's result as showing that the real numbers are not recursively enumerable.

Still, one might expect that since *T* is a partial function from the natural numbers onto the real numbers, that therefore the real numbers are *no more than* countable. And, since every natural number can be trivially represented as a real number, therefore the real numbers are *no less than* countable. They are, therefore *exactly* countable. However this reasoning is not constructive, as it still does not construct the required bijection. In fact the cardinality of sets fails to be totally ordered.

Axiom of choice

The status of the axiom of choice in constructive mathematics is complicated by the different approaches of different constructivist programs. One trivial meaning of "constructive", used informally by mathematicians, is "provable in ZF set theory without the axiom of choice." However, proponents of more limited forms of constructive mathematics would not assert that ZF itself is a constructive system.

In intuitionistic theories of type theory (especially higher-type arithmetic), many forms of the axiom of choice are permitted. For example, the axiom AC_{11} can be paraphrased to say that for any relation R on the set of real numbers, if you have proved that for each real number x there is a real number y such that $R(x,y)$ holds, then there is actually a function F such that $R(x,F(x))$ holds for all real numbers. Similar choice principles are accepted for all finite types. The motivation for accepting these seemingly nonconstructive principles is the intuitionistic understanding of the proof that "for each real number x there is a real number y such that $R(x,y)$ holds". According to the BHK interpretation, this proof itself is essentially the function F that is desired. The choice principles that intuitionists accept do not imply the law of the excluded middle.

However, in certain axiom systems for constructive set theory, the axiom of choice does imply the law of the excluded middle (in the presence of other axioms), as shown by the Diaconescu-Goodman-Myhill theorem. Some constructive set theories include weaker forms of the axiom of choice, such as the axiom of dependent choice in Myhill's set theory.

Measure theory

Classical measure theory makes deep usage of the axiom of choice, which is fundamental to, first, distinction between measurable and non-measurable sets, the existence of the latter being behind such famous results as the Banach–Tarski paradox, and secondly the hierarchies of notions of measure captured by notions such as Borel algebras, which are an important source of intuitions in set theory. Measure theory provides the foundation for the modern notion of integral, the Lebesgue integral.

It is possible to rework measure theory on the basis of the computable real line, where the set-theoretic basis for measurability is replaced by notions from order theory. This constructive measure theory provides the basis for computable analogues for Lebesgue integration.

The place of constructivism in mathematics

Traditionally, some mathematicians have been suspicious, if not antagonistic, towards mathematical constructivism, largely because of limitations they believed it to pose for constructive analysis. These views were forcefully expressed by David Hilbert in 1928, when he wrote in *Die Grundlagen der Mathematik*, "Taking the principle of excluded

middle from the mathematician would be the same, say, as proscribing the telescope to the astronomer or to the boxer the use of his fists".

Errett Bishop, in his 1967 work *Foundations of Constructive Analysis*, worked to dispel these fears by developing a great deal of traditional analysis in a constructive framework. Nevertheless, some mathematicians do not accept that Bishop did so successfully, since his book is necessarily more complicated than a classical analysis text would be.

Even though most mathematicians do not accept the constructivist's thesis, that only mathematics done based on constructive methods is sound, constructive methods are increasingly of interest on non-ideological grounds. For example, constructive proofs in analysis may ensure witness extraction, in such a way that working within the constraints of the constructive methods may make finding witnesses to theories easier than using classical methods. Applications for constructive mathematics have also been found in typed lambda calculi, topos theory and categorical logic, which are notable subjects in foundational mathematics and computer science. In algebra, for such entities as toposes and Hopf algebras, the structure supports an internal language that is a constructive theory; working within the constraints of that language is often more intuitive and flexible than working externally by such means as reasoning about the set of possible concrete algebras and their homomorphisms.

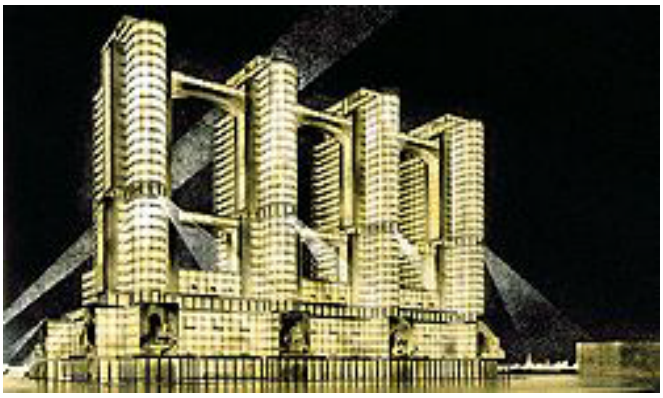
Physicist Lee Smolin writes in Three Roads to Quantum Gravity that topos theory is "the right form of logic for cosmology" (page 30) and "In its first forms it was called 'intuitionistic logic'" (page 31). "In this kind of logic, the statements an observer can make about the universe are divided into at least three groups: those that we can judge to be true, those that we can judge to be false and those whose truth we cannot decide upon at the present time" (page 28).

Mathematicians who have contributed to constructivism

- Errett Bishop (constructive analysis)
- Paul Lorenzen (constructive logic, analysis and metamathematics)
- A. A. Markov (constructive mathematics and logic)
- Leopold Kronecker (old constructivism)
- L. E. J. Brouwer (intuitionism)
- Arend Heyting (intuitionistic logic)
- Saul Kripke (intuitionistic logic)
- Per Martin-Löf (constructive type theory, a foundation for Bishop's analysis)
- Edward Nelson (predicative arithmetic)
- Harold Edwards (completed Kronecker's work on divisor theory, published a book of essays on constructivist mathematics)
- G. F. C. Griss (negationless intuitionistic mathematics)

Chapter- 8

Constructivist Architecture



Narkomtiazhprom, Vesnin brothers, 1934

Constructivist architecture was a form of modern architecture that flourished in the Soviet Union in the 1920s and early 1930s. It combined advanced technology and engineering with an avowedly Communist social purpose. Although it was divided into several competing factions, the movement produced many pioneering projects and finished buildings, before falling out of favour around 1932. Its effects have been marked on later developments in architecture.

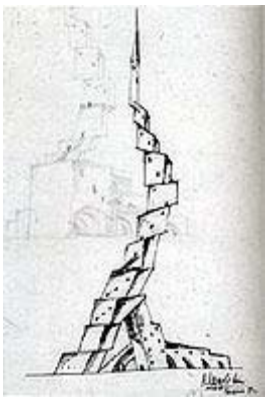
Defining constructivism

Tatlin's Tower, 1919

Constructivist architecture emerged from the wider constructivist art movement, which grew out of Russian Futurism. Constructivist art had attempted to apply a three-dimensional cubist vision to wholly abstract non-objective 'constructions' with a kinetic element. After the Russian Revolution of 1917 it turned its attentions to the new social demands and industrial tasks required of the new regime. Two distinct threads emerged, the first was encapsulated in Antoine Pevsner's and Naum Gabo's *Realist manifesto* which was concerned with space and rhythm, the second represented a struggle within the Commissariat for Enlightenment between those who argued for *pure art* and the Productivists such as Alexander Rodchenko, Varvara Stepanova and Vladimir Tatlin, a more socially-oriented group who wanted this art to be absorbed in industrial production.

A split occurred in 1922 when Pevsner and Gabo emigrated. The movement then developed along socially utilitarian lines. The productivist majority gained the support of the Proletkult and the magazine LEF, and later became the dominant influence of the architectural group O.S.A.

A revolution in architecture



Collective Housing design by Nikolai Ladovsky, 1920

The print shop of "Ogonyok" magazine designed by El Lissitzky

The first and most famous Constructivist architectural project was the 1919 proposal for the headquarters of the Comintern in St Petersburg by the Futurist Vladimir Tatlin, often

called Tatlin's Tower. Though it remained unbuilt, the materials—glass and steel—and its futuristic ethos and political slant (the movements of its internal volumes were meant to symbolise revolution and the dialectic) set the tone for the projects of the 1920s.

Another famous early Constructivist project was the Lenin Tribune by El Lissitzky (1920), a moving speaker's podium. During the Russian Civil War the UNOVIS group centred around Kasimir Malevich and Lissitzky designed various projects that forced together the 'non-objective' abstraction of Suprematism with more utilitarian aims, creating ideal Constructivist cities. In this and Tatlin's work the components of Constructivism could be seen to be an adaptation of various high-tech Western forms, such as the engineering feats of Gustave Eiffel and New York or Chicago's skyscrapers, for a new collective society.

ASNOVA and rationalism

Immediately after the Russian Civil War, the USSR was too impoverished to commission any major new building projects. Nonetheless, the Soviet avant-garde school Vkhutemas started an architectural wing in 1921, which was led by the architect Nikolai Ladovsky, which was called ASNOVA (association of new architects). The teaching methods were both functional and fantastic, reflecting an interest in gestalt psychology, leading to daring experiments with form such as Simbirchev's glass-clad suspended restaurant. Among the architects affiliated to the ASNOVA (Association of New Architects) were El Lissitzky, Konstantin Melnikov, Vladimir Krinsky and the young Berthold Lubetkin.

Zuev Workers' Club, 1927

Projects from 1923 to 1935 like Lissitzky and Mart Stam’s Wolkenbügel horizontal skyscrapers and Konstantin Melnikov’s temporary pavilions showed the originality and ambition of this new group. Melnikov would design the Soviet Pavilion at the Paris Exposition of Decorative Arts of 1925, which popularised the new style, with its rooms designed by Rodchenko and its jagged, mechanical form. Another glimpse of a Constructivist lived environment is visible in the popular science fiction film Aelita, which had interiors and exteriors modelled in angular, geometric fashion by Aleksandra Ekster. The state-run Mosselprom department store of 1924 was also an early modernist

building for the new consumerism of the New Economic Policy, as was the Vesnin brothers' Mostorg store, built three years later. Modern offices for the mass press were also popular, such as the Izvestia headquarters. This was built in 1926–7 and designed by Grigori Barkhin

OSA

Barsch/Sinyavsky, Moscow Planetarium, 1929

A colder and more technological Constructivist style was introduced by the 1923/4 glass office project by the Vesnin brothers for *Leningradskaya Pravda*. In 1925 the OSA Group, also with ties to Vkhutemas, was founded by Alexander Vesnin and Moisei Ginzburg — the Organisation of Contemporary Architects. This group had much in common with Weimar Germany's Functionalism, such as the housing projects of Ernst May. Housing, especially collective housing in specially designed *dom kommuny* to replace the collectivised 19th century housing that was the norm, was the main priority of this group. The term social condenser was coined to describe their aims, which followed from the ideas of V.I Lenin, who wrote in 1919 that *the real emancipation of women and real communism begins with the mass struggle against these petty household chores and the true reforming of the mass into a vast socialist household.*

Hotel *Iset* (Yekaterinburg, 'Chekists Village')

Collective housing projects that were built included Ivan Nikolaev's Communal House of the Textile Institute (Ordzhonikidze St, Moscow, 1929–1931), and Ginzburg's Moscow Gosstrakh flats and, most famously, his Narkomfin Building. Flats were built in a Constructivist idiom in Kharkiv, Moscow and Leningrad and in smaller towns. Ginzburg also designed a government building in Alma-Ata, while the Vesnin brothers designed a School of Film Actors in Moscow. Ginzburg critiqued the idea of building in the new society being the same as in the old: *treating workers' housing in the same way as they would bourgeois apartments...the Constructivists however approach the same problem with maximum consideration for those shifts and changes in our everyday life...our goal is the collaboration with the proletariat in creating a new way of life*. OSA published a magazine, *SA* or Contemporary Architecture from 1926 to 1930. The leading rationalist Ladovsky designed his own, rather different kind of mass housing, completing a Moscow apartment block in 1929. A particularly extravagant example is the 'Chekists Village' in Sverdlovsk (now Yekaterinburg) designed by I. Antonov, V. Sokolov and A. Tumbasov, a hammer and sickle shaped collective housing complex for members of the secret police, which currently serves as a hotel.

The everyday and the utopian

Narkomfin Building by Moisei Ginzburg. Currently under threat of demolition, the building is at the top of UNESCO's 'Endangered Buildings' list, and there is an international campaign to save it

The new forms of the Constructivists began to symbolise the project for a new everyday life of the Soviet Union, then in the mixed economy of the New Economic Policy. State buildings were constructed like the huge Gosprom complex in Kharkiv (designed by Serafimov, Folger and Kravets, 1926–8) which was noted by Reyner Banham in his *Theory and Design in the First Machine Age* as being, along with the Dessau Bauhaus, the largest scale Modernist work of the 1920s. Other notable works included the aluminum parabola and glazed staircase of Mikhail Barsch and Mikhail Sinyavsky's 1929 Moscow Planetarium.

Shukhov Tower, Moscow, 1922. Currently under threat of demolition, and there is an international campaign to save it.

The popularity of the new aesthetic led to traditionalist architects adopting Constructivism, as in Ivan Zholtovsky's 1926 MOGES power station or Alexey Shchusev's Narkomzem offices, both in Moscow. Similarly, the engineer Vladimir Shukhov's Shukhov Tower was often seen as an avant-garde work and was, according to Walter Benjamin in his Moscow Diary, 'unlike any similar structure in the West'. Shukhov also collaborated with Melnikov on the Bakhmetevsky Bus Garage and Novo-Ryazanskaya Street Garage. Many of these buildings are shown in Sergei Eisenstein's film The General Line, which also featured a specially built mock-up Constructivist collective farm designed by Andrey Burov.

A central aim of the Constructivists was instilling the avant-garde in everyday life. From 1927 they worked on projects for Workers' Clubs, communal leisure facilities usually built in factory districts. Among the most famous of these are the Kauchuk, Svoboda and Rusakov clubs by Konstantin Melnikov, the club of the Likachev works by the Vesnin brothers, and Ilya Golosov's Zuev Workers' Club.

Svoboda Factory Club by Melnikov, Moscow

At the same time as this foray into the everyday, outlandish projects were designed such as Ivan Leonidov's Lenin Institute, a high tech work that bears comparison with Buckminster Fuller. This consisted of a skyscraper-sized library, a planetarium and dome, all linked together by a monorail; or Georgy Krutikov's self explanatory Flying City, an ASNOVA project that was intended as a serious proposal for airborne housing. Melnikov House and his Bakhmetevsky Bus Garage are fine examples of the tensions between individualism and utilitarianism in Constructivism. There were also projects for Suprematist skyscrapers called 'planits' or 'architektons' by Kasimir Malevich, Lazar Khikeidel and Nikolai Suetin. The fantastical element also found expression in the work of Yakov Chernikhov, who produced several books of experimental designs — most famously *Architectural Fantasies* (1933) — earning him the epithet 'the Soviet Piranesi'.

Western constructivism

The Van Nelle Factory in Rotterdam by Leendert van der Vlugt (and Mart Stam) 1927-31

El Lissitzky's contacts in Germany and Switzerland, as well as the impact of Melnikov's Paris Pavilion, led to many architects outside the USSR considering their work as Constructivist by the late 1920s. Architects of the New Objectivity like Lissitzky's collaborators Mart Stam and the ABC Group led by Hannes Meyer embraced Constructivism's severe geometry and technologically advanced aesthetic, despite their remoteness from their original context. The shift of the Bauhaus in 1922 towards 'art and technology — a new unity' was often considered to be a Constructivist one, while the Czech critic and designer Karel Teige's 1932 book *The Minimum Dwelling* uses Functionalism and Constructivism as interchangeable terms. Perhaps the best known example of Western Constructivism is the Van Nelle factory in Rotterdam, by Leendert van der Vlugt (and Mart Stam) of the architectural firm Brinkman & Van der Vlugt.

The Sotsgorod *and town planning*

Town Hall by Noi Trotsky, Leningrad, 1932–4

Despite the ambitiousness of many Constructivist proposals for reconstructed cities, there were fairly few examples of coherent Constructivist town planning. However the Narvskaya Zastava district of Leningrad became a focus for Constructivism. Beginning in 1925 communal housing was designed for the area by architects like A. Gegello and OSA's Alexander Nikolsky, as well as public buildings like the Kirov Town Hall by Noi Trotsky (1932–4), an experimental school by G.A Simonov and a series of Communal laundries and kitchens, designed for the area by local ASNOVA members. Many of the Constructivists hoped to see their ambitions realised during the 'Cultural Revolution' that accompanied the first Five Year Plan. At this point the Constructivists were divided between urbanists and disurbanists who favoured a garden city or linear city model. The Linear City was propagandised by the head of the Finance Commissariat Nikolay Milyutin in his book *Sozgorod*, aka *Sotsgorod* (1930). This was taken to a more extreme level by the OSA theorist Mikhail Okhitovich. His disurbanism proposed a system of one-person or one-family buildings connected by linear transport networks, spread over a huge area that traversed the boundaries between the urban and agricultural, in which it resembled a socialist equivalent of Frank Lloyd Wright's Broadacre City. The disurbanists and urbanists proposed projects for new cities such as Magnitogorsk were often rejected in favour of the more pragmatic German architects fleeing Nazism, such as 'May Brigade' (Ernst May, Mart Stam, Margarete Schütte-Lihotzky), the 'Bauhaus Brigade' led by Hannes Meyer, and Bruno Taut.

A 'disurbanist' plan by Ginzburg and Barsch, 1930

The city-planning of Le Corbusier found brief favour, with the architect writing a ‘reply to Moscow’ that later became the Ville Radieuse plan, and designing the Tsentrosoyuz government building with the Constructivist Nikolai Kolli. The duplex apartments and collective facilities of the OSA group were a major influence on his later work. Another famous modernist Erich Mendelsohn designed Leningrad's Red Banner Textile Factory, and popularised Constructivism in his book *Russland, Europa, Amerika*. A Five Year Plan project with major Constructivist input was DnieproGES, designed by Victor Vesnin et al. El Lissitzky also popularised the style abroad with his 1930 book *The Reconstruction of Architecture in Russia*.

The end of constructivism

Intourist Garage by Konstantin Melnikov, 1933

The 1932 competition for the Palace of the Soviets, a grandiose project to rival the Empire State Building, featured entries from all the major Constructivists as well as Walter Gropius, Erich Mendelsohn and Le Corbusier. However, this coincided with widespread criticism of Modernism, which was always difficult to sustain in a still mostly agrarian country. There was also the critique that the style merely copied the forms of technology while using fairly routine construction methods. The winning entry by Boris Iofan marked the start of eclectic historicism of Stalinist Architecture, a style which bears similarities to Post-Modernism in that it reacted against modernist architecture's cosmopolitanism, alleged ugliness and inhumanity with a pick and mix of historical styles, sometimes achieved with new technology. Housing projects like the Narkomfin

were designed for the attempts to reform everyday life in the 20s, such as collectivisation of facilities, equality of the sexes and collective raising of children, all of which fell out of favour as Stalinism revived family values. The styles of the old world were also revived, with the Moscow Metro in particular popularising the idea of 'workers' palaces'.

School 518 by Ivan Zvezdin, 1935

By the end of the 1920s Constructivism was the country's dominant architecture, and surprisingly many buildings of this period survive. Initially the reaction was towards an art decoesque Classicism that was initially inflected with Constructivist devices, such as in Iofan's House on Embankment of 1929–32. For a few years some structures were designed in a composite style sometimes called Postconstructivism.

After this brief synthesis, Neo-Classical reaction was totally dominant until 1955. Rationalist buildings were still common in industrial architecture, but extinct in urban projects. Last isolated constructivist buildings were launched in 1933–1935, such as Panteleimon Golosov's Pravda building (finished 1935), the Moscow Textile Institute (finished 1938) or Ladovsky's rationalist vestibules for the Moscow Metro. Clearly Modernist competition entries were made by the Vesnin brothers and Ivan Leonidov for the Narkomtiazhprom project in Red Square, 1934, another unbuilt Stalinist edifice. Traces of Constructivism can also be found in some Socialist Realist works, for instance in the Futurist elevations of Iofan's ultra-Stalinist 1937 Paris Pavilion, which had Suprematist interiors by Nikolai Suetin.

Legacy

Due in part to its political commitment — and its replacement by Stalinist architecture — the mechanistic, dynamic forms of Constructivism were not part of the calm Platonism of the International Style as it was defined by Philip Johnson and Henry-Russell Hitchcock. Their book included only one building from the USSR, an electrical laboratory by government team led by Nikolaev. During the 1960s Constructivism was rehabilitated to a certain extent, and both the wilder experimental buildings of the era (such as the Globus Theatre or the Tbilisi Roads Ministry Building) and the unornamented Khrushchyovka apartments are in a sense a continuation of the aborted experiment, although under very different conditions. Outside the USSR, Constructivism has often been seen as an alternative, more radical modernism, and its legacy can be seen in designers as diverse as Team 10, Archigram and Kenzo Tange, as well as in much Brutalist work. Their

integration of the avant-garde and everyday life has parallels with the Situationists, particularly the New Babylon project of Guy Debord and Constant Nieuwenhuys.

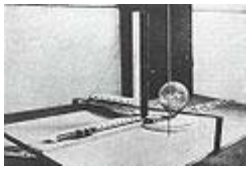
High Tech architecture also owes a debt to Constructivism, most obviously in Richard Rogers' Lloyd's building. Zaha Hadid's early projects were adaptations of Malevich's Architektons, and the influence of Chernikhov is clear on her drawings. Deconstructivism evokes the dynamism of Constructivism, though without the social aspect, as in the work of Coop Himmelb(l)au. In the late 70s Rem Koolhaas wrote a parable on the political trajectory of Constructivism called *The Story of the Pool*, in which Constructivists escape from the USSR in a self-powering Modernist swimming pool, only to die, after being criticised for much the same reasons as they were under Stalinism, soon after their arrival in the USA. Meanwhile, many of the original Constructivist buildings are poorly preserved or in danger of imminent demolition.

Leningradskaya Pravda (Vesnin brothers, 1923)

Mosselprom Building (David Kogan, 1923–4)

Novo-Ryazanskaya Street Garage (Melnikov, 1926)

Izvestia Building, Moscow (Grigori & Mikhail Barkhin, 1926)



Lenin Institute (Ivan Leonidov, 1927)

Svoboda Factory Club (Melnikov, 1927)

Kauchuk Factory Club (Melnikov, 1927)

Flats, Zamoskvorechye, Moscow (late 1920s)

Rusakov Workers' Club (Melnikov, 1927)

Tank Engine Offices (Ivan Fomin, 1929)

Narkomfin Building (Moisei Ginzburg, 1930)

MPS Building, Moscow (Ivan Fomin, 1930s)

Red Carnation Factory, St Petersburg (Yakov Chernikhov)

Likachev Palace of Culture, Moscow (Vesnin brothers, 1930–8)

Intourist Garage (Melnikov, 1934)

Krasniye Vorota Metro Station (Nikolai Ladovsky, 1935)

Textile Institute, Moscow (1930–8)

Gosprom building in Kharkiv, 1925-1928

Chapter- 9

Anti-art

L.H.O.O.Q. (1919). Marcel Duchamp.

Anti-art is a loosely-used term applied to an array of concepts and attitudes that reject prior definitions of art and question art in general. Anti-art tends to conduct this questioning and rejection from the vantage point of art. The term is associated with the Dada movement and is generally accepted as attributable to Marcel Duchamp pre-World War I, when he began to use found objects as art.

An expression of anti-art can take the form of art or not. In general, anti-art rejects only some aspects of art. Depending on the case, "anti-artworks" may reject conventional artistic standards.

Anti-artworks may also reject the art market, and high art. Anti-artworks may reject individualism in art. Anti-art may reject "universality" as an accepted factor in art, and some forms of anti-art reject art entirely. Depending on the case, anti-art artworks may reject art as a separate realm or as a specialization

Anti-art artworks may reject art based upon a consideration of art as being oppressive of a segment of the population.

Anti-art artworks may articulate a disagreement with the generally supposed notion of there being a separation between art and life. Indeed, anti-art artworks may voice a question as to whether "art" really exists or not. "Anti-art" has been referred to as a "paradoxical neologism," in that its ostensible opposition to art has been observed concurring with staples of twentieth century art or "modern art," in particular art movements that have self-consciously sought to transgress traditions or institutions. Anti-art itself is not a distinct art movement, however. This would tend to be indicated by the time it spans—longer than that usually spanned by art movements. Some art movements though, are labeled "anti-art." The Dada movement is generally considered the first anti-art movement; the term anti-art itself is said to have been coined by Dadaist Marcel Duchamp around 1914, and his ready-mades have been cited as early examples of anti-art objects. Theodor W. Adorno in *Aesthetic Theory* (1970) stated that "...even the abolition of art is respectful of art because it takes the truth claim of art seriously."

Anti-art has become generally accepted by the artworld to be art, although some people still reject Duchamp's readymades as art, for instance the Stuckist group of artists, who are "anti-anti-art".

Forms of anti-art

Marcel Duchamp, *Fountain,* 1917. Photograph by Alfred Stieglitz

Anti-art can take the form of art or not. It is posited that anti-art need not even take the form of art, in order to embody its function as anti-art. This point is disputed. Some of the forms of anti-art which are art strive to reveal the conventional limits of art by expanding its properties.

Some instances of anti-art are suggestive of a reduction to what might seem to be fundamental elements or building blocks of art. Examples of this sort of phenomenon might include monochrome paintings, empty frames, silence as music, chance art. Anti-art is also often seen to make use of highly innovative materials and techniques, and well beyond—to include hitherto unheard of elements in visual art. These types of anti-art can be readymades, found art, détournement, combine paintings, appropriation (art), happenings, performance art, body art.

Anti-art can involve the renouncement of making art entirely. This can be accomplished through an art strike and this can also be accomplished through revolutionary activism. An aim of anti-art can be to undermine or understate individual creativity. This may be accomplished through the utilization of readymades. Individual creativity can be further downplayed by the use of industrial processes in the making of art. *Anti-artists* may seek to undermine individual creativity by producing their artworks anonymously. They may refuse to show their artworks. They may refuse public recognition. Anti-artists may choose to work collectively, in order to place less emphasis on individual identity and individual creativity. This can be seen in the instance of happenings. This is sometimes the case with "supertemporal" artworks, which are by design impermanent. Anti-artists will sometimes destroy their works of art. Some artworks made by anti-artists are purposely created to be destroyed. This can be seen in auto-destructive art.

(It should be noted that André Malraux has developed a concept of anti-art quite different from that outlined above. For Malraux, anti-art began with the 'Salon' or 'Academic' art of the nineteenth century which rejected the basic ambition of art in favour of a semi-photographic illusionism (often prettified). Of Academic painting, Malraux writes, 'All true painters, all those for whom painting is a value, were nauseated by these pictures – "Portrait of a Great Surgeon Operating" and the like – because they saw in them not a form of painting, but the negation of painting'. For Malraux, anti-art is still very much with us, though in a different form. Its descendants are commercial cinema and television, and popular music and fiction. The 'Salon', Malraux writes, 'has been expelled from painting, but elsewhere it reigns supreme'.)

History

Pre World War I

Jean-Jacques Rousseau rejected the separation between performer and spectator, life and theatre. Karl Marx posited that art was a consequence of the class system and therefore concluded that, in a communist society, there would only be people who engage in the making of art and no "artists".

Illustration of "Le rire" (1887). First shown 1883 at an "Incohérents" exhibition by Arthur Sapeck (Eugène Bataille).

Arguably the first movement that deliberately set itself in opposition to established art were the Incoherents in late 19th. century Paris. Founded by Jules Lévy in 1882, the Incoherents organized charitable art exhibitions intended to be satirical and humoristic, they presented "...drawings by people who can't draw..." and held masked balls with artistic themes, all in the greater tradition of Montmartre cabaret culture. While short lived - the last Incoherent show took place in 1896 - the movement was popular for its entertainment value. In their commitment to satire, irreverence and ridicule they produced a number of works that show remarkable formal similarities to creations of the avant-garde of the 20th century: ready-mades, monochromes, empty frames and silence as music.

Dada and constructivism

Beginning in Switzerland, during World War I, much of Dada, and some aspects of the art movements it inspired, such as Neo-Dada, Nouveau réalisme and Fluxus, is considered anti-art. Dadaists rejected cultural and intellectual conformity in art and more broadly in society. For everything that art stood for, Dada was to represent the opposite.

Where art was concerned with traditional aesthetics, Dada ignored aesthetics at all. If art was to appeal to sensibilities, Dada was intended to offend. Through their rejection of traditional culture and aesthetics the Dadaists hoped to destroy traditional culture and aesthetics. Because they were more politicized, the Berlin dadas were the most radically anti-art within Dada. In 1919, in the Berlin group, the Dadaist revolutionary central council outlined the Dadaist ideals of radical communism.

Beginning in 1913 Marcel Duchamp's readymades challenged individual creativity and redefine art as a nominal rather than an intrinsic object.

Tristan Tzara indicated: "I am against systems; the most acceptable system is on principle to have none." In addition, Tzara, who once stated that "logic is always false", probably approved of Walter Serner's vision of a "final dissolution". A core concept in Tzara's thought was that "as long as we do things the way we think we once did them we will be unable to achieve any kind of livable society."

Originating in Russia in 1919, constructivism rejected art in its entirety and as a specific activity creating a universal aesthetic in favour of practises directed towards social purposes, "useful" to everyday life, such as graphic design, advertising and photography. In 1921, exhibiting at the 5x5=25 exhibition, Alexander Rodchenko created monochromes and proclaimed the end of painting. For artists of the Russian Revolution, Rodchenko's radical action was full of utopian possibility. It marked the end of art along with the end of bourgeois norms and practices. It cleared the way for the beginning of a new Russian life, a new mode of production, a new culture.

Surrealism

Beginning in the early 1920s, many Surrealist artists and writers regard their work as an expression of the philosophical movement first and foremost, with the works being an artifact. Surrealism as a political force developed unevenly around the world, in some places more emphasis was on artistic practices, in other places political and in other places still, Surrealist praxis looked to supersize both the arts and politics. Politically, Surrealism was ultra-leftist, communist, or anarchist. The split from Dada has been characterised as a split between anarchists and communists, with the Surrealists as communist. In 1925, the Bureau of Surrealist Research declared their affinity for revolutionary politics. By the 1930s many Surrealists had strongly identified themselves with communism. Breton and his comrades supported Leon Trotsky and his International Left Opposition for a while, though there was an openness to anarchism that manifested more fully after World War II.

Leader André Breton was explicit in his assertion that Surrealism was above all a revolutionary movement. Breton believed the tenets of Surrealism could be applied in any circumstance of life, and is not merely restricted to the artistic realm. Breton's followers, along with the Communist Party, were working for the "liberation of man." However, Breton's group refused to prioritize the proletarian struggle over radical creation such that their struggles with the Party made the late 1920s a turbulent time for both. Many individuals closely associated with Breton, notably Louis Aragon, left his group to work more closely with the Communists. In 1929, Breton asked Surrealists to assess their "degree of moral competence", and theoretical refinements included in the second *manifeste du surréalisme* excluded anyone reluctant to commit to collective action

Lettrism and the Situationist International

Founded in the mid-1940s in France by Isidore Isou, the Letterists utilised material appropriated from other films, a technique which would subsequently be developed (under the title of 'détournement') in Situationist films. They would also often supplement the film with live performance, or, through the 'film-debate', directly involve the audience itself in the total experience. The most radical of the Letterist films, Wolman's *The Anticoncept* and Debord's *Howls for Sade* abandoned images altogether.

In 1956, recalling the infinitesimals of G.W. Leibniz, quantities which could not actually exist except conceptually, the founder of Lettrism, Isidore Isou, developed the notion of a work of art which, by its very nature, could never be created in reality, but which could nevertheless provide aesthetic rewards by being contemplated intellectually. Related to this, and arising out of it, is excoördism, the current incarnation of the Isouian movement, defined as the art of the infinitely large and the infinitely small.

In 1960, Isidore Isou created supertemporal art: a device for inviting and enabling an audience to participate in the creation of a work of art. In its simplest form, this might involve nothing more than the inclusion of several blank pages in a book, for the reader to add his or her own contributions.

In Japan in the late 1950s, Group Kyushu was an edgy, experimental and rambunctious art group. They ripped and burned canvasses, stapled corrugated cardboard, nails, nuts, springs, metal drill shavings, and burlap to their works, assembled all kinds of unwieldy junk assemblages, and were best known for covering much of their work in tar. They also occasionally covered their work in urine and excrement. They tried to bring art closer to everyday life, by incorporating objects from daily life into their work, and also by exhibiting and performing their work outside on the street for everyone to see.

Other similar anti-art groups included Neo-Dada (Neo-Dadaizumu Oganaizazu), Gutai (Gutai Bijutsu Kyokai), and Hi-Red-Center. Influenced in various ways by L'Art Informel, these groups and their members worked to foreground material in their work: rather than seeing the art work as representing some remote referent, the material itself and the artists' interaction with it became the main point. The freeing up of gesture was another legacy of L'Art Informel, and the members of Group Kyushu took to it with great verve, throwing, dripping, and breaking material, sometimes destroying the work in the process.

Beginning in the 1950s in France, the Letterist International and after the Situationist International developed a dialectical viewpoint, seeing their task as *superseding* art, abolishing the notion of art as a separate, specialized activity and transforming it so it became part of the fabric of everyday life. From the Situationist's viewpoint, art is revolutionary or it is nothing. In this way, the Situationists saw their efforts as completing the work of both Dada and surrealism while abolishing both. The situationists renounced the making of art entirely.

The Situationist International was probably the most radical, politicized, well organized and theoretically productive anti-art movement, reaching its apex with the student protests and general strike of May 1968 in France.

In 1959 Guiseppe Pinot-Gallizio proposed Industrial Painting as an "industrial-inflationist art"

Neo-dada and later

Similar to Dada, in the 1960s, Fluxus included a strong current of anti-commercialism and an anti-art sensibility, disparaging the conventional market-driven art world in favor of an artist-centered creative practice. Fluxus artists used their minimal performances to blur the distinction between life and art.

In 1962 Henry Flynt began to campaign for an anti-art position. Flynt wanted avant-garde art to become superseded by the terms of *veramusement* and *brend* - neologisms meaning approximately pure recreation.

In 1963 George Maciunas advocated revolution, "living art, anti-art" and "non art reality to be grasped by all peoples". Maciunas strived to uphold his stated aims of demonstrating the artist's 'non-professional status...his dispensability and inclusiveness' and that 'anything can be art and anyone can do it.'

In the 1960s, the Dada-influenced art group Black Mask declared that revolutionary art should be "an integral part of life, as in primitive society, and not an appendage to wealth." Black Mask disrupted cultural events in New York by giving made up flyers of art events to the homeless with the lure of free drinks. After, the Motherfuckers grew out of a combination of Black Mask and another group called Angry Arts.

During the 1970s, King Mob is responsible for various attacks on art galleries. According to the philosopher Roger Taylor the concept of art is not universal but is an invention of bourgeois ideology helping to promote this social order. He compares it to a cancer that colonises other forms of life so that it becomes difficult to distinguish one from the other.

Stewart Home called for an Art Strike between 1990 and 1993. Unlike earlier art-strike proposals such as that of Gustav Metzger in the 1970s, it was not intended as an opportunity for artists to seize control of the means of distributing their own work, but rather as an exercise in propaganda and psychic warfare aimed at smashing the entire art world rather than just the gallery system. As Black Mask had done in the 1960s, Stewart Home disrupted cultural events in London in the 1990s by giving made up flyers of literary events to the homeless with the lure of free drinks.

The K Foundation was an art foundation that published a series of Situationist-inspired press adverts and extravagant subversions in the art world. Most notoriously, when their

plans to use banknotes as part of a work of art fell through, they burnt a million pounds in cash.

Punk has developed anti-art positions. Some “industrial music” bands describe their work as a form of “cultural terrorism” or as a form of “anti-art”. The term is also used to describe other intentionally provocative art forms, such as nonsense verse.

Anti-art becomes art

Paradoxically, most forms of anti-art have gradually been completely accepted by the art establishment as normal and conventional forms of art. Even the movements which rejected art with the most virulence are now collected by the most prestigious cultural institutions.

Duchamp's ready-mades are still regarded as anti-art by the Stuckists, who also say that anti-art has become conformist, and describe themselves as anti-anti-art.

Chapter- 10

Social Constructionism

Social constructionism and social constructivism are sociological theories of knowledge that consider how social phenomena or objects of consciousness develop in social contexts. A social construction (social construct) is a concept or practice that is the construct (or artifact) of a particular group. When we say that something is socially constructed, we are focusing on its dependence on contingent variables of our social selves rather than any inherent quality that it possesses in itself. The underlying assumptions on which social constructivism is typically seen to be based are reality, knowledge, and learning.

Social constructs are generally understood to be the by-products of countless human choices rather than laws resulting from divine will or nature. This is not usually taken to imply a radical anti-determinism, however. Social constructionism is usually opposed to essentialism, which instead defines specific phenomena in terms of inherent and transhistorical essences independent of conscious beings that determine the categorical structure of reality.

A major focus of social constructionism is to uncover the ways in which individuals and groups participate in the construction of their perceived social reality. It involves looking at the ways social phenomena are created, institutionalized, known, and made into tradition by humans. The social construction of reality is an ongoing, dynamic process that is (and must be) reproduced by people acting on their interpretations and their knowledge of it. Because social constructs as facets of reality and objects of knowledge are not "given" by nature, they must be constantly maintained and re-affirmed in order to persist. This process also introduces the possibility of change: what "justice" is and what it means shifts from one generation to the next.

Ian Hacking noted in "The Social Construction of What?" that social construction talk is often in reference not only to worldly items, like things and facts – but also to beliefs about them. It is relevant to note that this perspective is often correctly closely connected with many contemporary theories, perhaps most notably the developmental theories of Lev Vygotsky and Jerome Bruner.

Social constructionism vs. social constructivism

Although both social constructionism and social constructivism deal with ways in which social phenomena develop, they are distinct. Social constructionism refers to the development of phenomena relative to social contexts while social constructivism refers to an individual's making meaning of knowledge within a social context (Vygotsky 1978). For this reason, social constructionism is typically described as a sociological concept whereas social constructivism is typically described as a psychological concept. However, while distinct, they are also complementary aspects of a single process through which humans in society create their worlds and, thereby, themselves.

Social constructivism has been studied by many educational psychologists, who are concerned with its implications for teaching and learning.

Constructionism became prominent in the U.S. with Peter L. Berger and Thomas Luckmann's 1966 book, *The Social Construction of Reality*. Berger and Luckmann argue that all knowledge, including the most basic, taken-for-granted common sense knowledge of everyday reality, is derived from and maintained by social interactions. When people interact, they do so with the understanding that their respective perceptions of reality are related, and as they act upon this understanding their common knowledge of reality becomes reinforced. Since this common sense knowledge is negotiated by people, human typifications, significations and institutions come to be presented as part of an objective reality, particularly for future generations who were not involved in the original process of negotiation. For example, as parents negotiate rules for their children to follow, those rules confront the children as externally produced "givens" that they cannot change. Berger and Luckmann's social constructionism has its roots in phenomenology. It links to Heidegger and Edmund Husserl through the teaching of Alfred Schutz, who was also Berger's PhD adviser.

During the 1970s and 1980s, social constructionist theory underwent a transformation as constructionist sociologists engaged with the work of Michel Foucault and others as a narrative turn in the social sciences was worked out in practice. This had a particular impact on the emergent sociology of science and the growing field of science and technology studies. In particular, Karin Knorr-Cetina, Bruno Latour, Barry Barnes, Steve Woolgar, and others used social constructionism to relate what science has typically characterized as objective facts to the processes of social construction, with the goal of showing that human subjectivity imposes itself on those facts we take to be objective, not solely the other way around. A particularly provocative title in this line of thought is Andrew Pickering's *Constructing Quarks: A Sociological History of Particle Physics*. At the same time, Social Constructionism shaped studies of technology - the Sofield, especially on the Social construction of technology, or SCOT, and authors as Wiebe Bijker, Trevor Pinch, Maarten van Wesel, etc. Despite its common perception as objective, mathematics is not immune to social constructionist accounts. Sociologists such as Sal Restivo and Randall Collins, mathematicians including Reuben Hersh and Philip J. Davis, and philosophers including Paul Ernest have published social constructionist treatments of mathematics.

Social constructionism and postmodernism

Social constructionism can be seen as a source of the postmodern movement, and has been influential in the field of cultural studies. Some have gone so far as to attribute the rise of cultural studies (the cultural turn) to social constructionism. Within the social constructionist strand of postmodernism, the concept of socially constructed reality stresses the on-going mass-building of worldviews by individuals in dialectical interaction with society at a time. The numerous realities so formed comprise, according to this view, the imagined worlds of human social existence and activity, gradually crystallised by habit into institutions propped up by language conventions, given ongoing legitimacy by mythology, religion and philosophy, maintained by therapies and socialization, and subjectively internalised by upbringing and education to become part of the identity of social citizens.

Social constructionism and personal construct psychology

Since its appearance in the 1950s, personal construct psychology (PCP) has mainly developed as a constructivist theory of personality and a system of transforming individual meaning-making processes, largely in therapeutic contexts. It was based around the notion of persons as scientists who form and test theories about their worlds. Therefore, it represented one of the first attempts to appreciate the constructive nature of experience and the meaning persons give to their experience. Social constructionism (SC), on the other hand, mainly developed as a form of a critique, aimed to transform the oppressing effects of the social meaning-making processes. Over the years, it has grown into a cluster of different approaches, with no single SC position. However, different approaches under the generic term of SC are loosely linked by some shared assumptions about language, knowledge, and reality.

A usual way of thinking about the relationship between PCP and SC is treating them as two separate entities that are similar in some aspects, but also very different in others. This way of conceptualizing this relationship is a logical result of the circumstantial differences of their emergence. In subsequent analyses these differences between PCP and SC were framed around several points of tension, formulated as binary oppositions: personal/social; individualist/relational; agency/structure; constructivist/constructionist. Although some of the most important issues in contemporary psychology are elaborated in these contributions, the polarized positioning also sustained the idea of a separation between PCP and SC, paving the way for only limited opportunities for dialogue between them.

Reframing the relationship between PCP and SC may be of use in both the PCP and the SC communities. On one hand, it extends and enriches SC theory and points to benefits of applying the PCP “toolkit” in constructionist therapy and research. On the other hand, the reframing contributes to PCP theory and points to new ways of addressing social construction in therapeutic conversations.

The teleology of social construction

The concepts of *weak* and **strong** as applied to opposing philosophical positions, "isms", inform a teleology, the goal oriented, meaningful, or final end of a mode of interpretation of reality. "Isms" are not personal opinions, but the extreme, modal, formulations that actual persons, individuals, can then consider, and take a position between. There are opposing philosophical positions concerning the feasibility of co-creating a common, shared, social reality, called *weak* and **strong**.

John R. Searle does not elucidate the terms **strong** and *weak* in his book *The Construction of Social Reality*, but he clearly uses them in his Chinese room argument, where he debates the feasibility of creating a computing machine with a sharable understanding of reality, and he adds "We are precisely such machines." **Strong** artificial intelligence (Strong AI) is the bet that computer programmers will somehow eventually achieve a computing machine with a mind of its own, and that it will eventually be more powerful than a human mind. Weak AI bets they won't.

David Deutch in his book *The Fabric of Reality* uses a form of **strong** Turing principle to share Frank Tipler's view of the final state of the universe as an omnipotent (but not omniscient), Omega point, computer. *But this computer is a society of creative thinkers, or people* (albeit posthuman transhuman persons), having debates in order to generate information, in the never-ending attempt to attain omniscience of this physics — its evolutionary forms, its computational abilities, and the methods of its epistemology — having an eternity to do so. (p. 356)

Because both the Chinese room argument and the construction of social reality deal with Searle and his debates, and because they both use *weak* and **strong** to denote a philosophical position, and because both debate the programmability of "the other", it is worth noting the correspondence that "strong AI" is **strong** social constructionism, and "weak AI" is weak social constructivism.

Strong social constructiv*ism* says "none are able to *communicate* either a full reality or an accurate ontology, therefore my position must impose, by a sort of divine right, my observer-relative epistemology", whereas weak social constructiv*ism* says "none are able to *know* a full reality, therefore *we must* cooperate, informing and conveying an objective ontology as best we can."

Weak teleology

Weak social constructionism sees the underlying, objective, "brute factual", elements of the class of languages and functional assignments of human, metaphysical, reality. Brute facts are all facts that are not institutional (metaphysical, social agreement) facts. The skeptic portrays the *weak* aspect of social constructivism, and want to spend effort debating the institutional realities.

Harvard psychologist Steven Pinker writes that "some categories really are social constructions: they exist only because people tacitly agree to act as if they exist. Examples include money, tenure, citizenship, decorations for bravery, and the presidency of the United States."

In a similar vein, Stanley Fish has suggested that baseball's "balls and strikes" are social constructions.

Both Fish and Pinker agree that the sorts of objects indicated here can be described as part of what John Searle calls "social reality". In particular, they are, in Searle's terms, ontologically subjective but epistemologically objective. "Social facts" are temporally, ontologically, and logically dependent on "brute facts." For example, "money" in the form of its raw materials (rag, pulp, ink) as constituted socially for barter (for example by a banking system) is a social fact of "money" by virtue of (i) collectively willing and intending (ii) to impose some particular function (purpose for which), (iii) by constitutive rules atop the "brute facts." "Social facts have the remarkable feature of having no analogue among physical brute facts" (34). The existence of language is itself constitutive of the social fact (37), which natural or brute facts do not require. Natural or "brute" facts exist independently of language; thus a "mountain" is a mountain in every language and in no language; it simply is what it is.

Searle illustrates the evolution of social facts from brute facts by the constitutive rule: X counts as Y in C. "The Y terms has to assign a new *status* that the object does not already have just in virtue of satisfying the Y term; and there has to be collective agreement, or at least acceptance, both in the imposition of that status on the stuff referred to by the X term and about the function that goes with that status. Furthermore, because the physical features brute facts specified by the X term are insufficient by themselves to guarantee the fulfillment of the assigned function specified by the Y term, the new status and its attendant functions have to be the sort of things that can be constituted by collective agreement or acceptance."

It is true that language is not a "brute fact", that it is an institutional fact, a human convention, a metaphysical reality (that happens to be physically uttered), but Searle points out that there are language-independent thoughts "noninstitutional, primitive, biological inclinations and cognitions not requiring any linguistic devises", and that there are many "brute facts" amongst both humans and animals that are truths that should not be altered in the social constructs because language does not truly constitute them, despite the attempt to institute them for any group's gain: money and property are language dependent, but desires (thirst, hunger) and emotions (fear, rage) are not. (Descartes describes the difference between imagination as a sort of vision, or image, and intellect as conceptualizing things by symbolic manipulation.) Therefore, there is doubt that society or a computer can be completely programmed by language and images, (because there is a programmable, emotive effect of images that derives from the language of judgment towards images).

Finally, against the strong theory and for the weak theory, Searle insists, "it could not be the case, as some have maintained, that all facts are institutional [i.e., social] facts, that there are no brute facts, because the structure of institutional facts reveals that they are logically dependent on brute facts. To suppose that all facts are institutional [i.e., social] would produce an infinite regress or circularity in the account of institutional facts. In order that some facts be institutional, there must be other facts that are brute [i.e., physical, biological, natural]. This is the consequence of the logical structure of institutional facts."

Ian Hacking, Canadian philosopher of science, insists, "the notion that everything is socially constructed has been going the rounds. John Searle [1995] argues vehemently (and in my opinion cogently) against universal constructionism". "Universal social constructionism is descended from the doctrine that I once named linguistic idealism and attributed, only half in jest, to Richard Nixon [Hacking, 1975, p. 182]. Linguistic idealism is the doctrine that only what is talked about exists, nothing has reality until it is spoken of, or written about. This extravagant notion is descended from Berkeley's idea-ism, which we call idealism: the doctrine that all that exists is mental". "They are a part of what John Searle [1995] calls social reality. His book is titled the *Construction of Social Reality,* and as I explained elsewhere [Hacking, 1996], that is not a *social* construction book at all".

Hacking observes, "the label 'social constructionism' is more code than description" of every Leftist, Marxist, Freudian, and Feminist PostModernist to call into question every moral, sex, gender, power, and deviant claim as just another essentialist claim—including the claim that members of the male and female sex are inherently different, rather than historically and socially constructed. Hacking observes that his 1995 simplistic dismissal of the concept actually revealed to many readers the outrageous implications of the theorists: Is child abuse a real evil, or a social construct, asked Hacking? His dismissive attitude, "gave some readers a way to see that there need be no clash between construction and reality", inasmuch as "the metaphor of social construction once had excellent shock value, but now it has become tired".

Informally, they require human practices to sustain their existence, but they have an effect that is (basically) universally agreed upon. The disagreement lies in whether this category should be called "socially constructed". Ian Hacking argues that it should not. Furthermore, it is not clear that authors who write "social construction" analyses ever mean "social construction" in Pinker's sense. If they never do, then Pinker (probably among others) has misunderstood the point of a social constructionist argument.

To understand how weak social constructionism can conclude that metaphysics (a human affair) is not the entire "reality", see the arguments against the study metaphysics. Kant similarly argues there are realities we cannot ever know, and therefore cannot ever tell of. This inability to accurately share the *full* reality, even given time for a rational conversation, is similarly proclaimed by *weak artificial intelligence*.

Strong teleology

Strong social constructionism sees everything as a social construction, everything as metaphysical. This is not to say that it sees the outer world as having beings in a non-reality, as unreal. Rather, it proposes that the notions of "real" and "unreal" are themselves social constructs, so that the question of whether anything is "real" is just a matter of social convention. The conservative proponent of institutions the way they are progressing, would, in Rudolph Carnap's words "pretend to teach knowledge which is of a higher level than that of empirical science." Everyone else has *their own* reality, and take the stance that "if you have to ask, you would not understand."

Strong social constructionists oppose the existence of "brute" facts. That a mountain is a *mountain* (as opposed to just another undifferentiated clump of earth) is socially engendered, and not a *brute* fact. That the concept of mountain is universally admitted in all human languages reflects near-universal human consensus, but does not make it an objective reality; similarly for all apparently real objects and events: trees, cars, snow, collisions. It reasons that all reality is thought, all thought is in a language, all language is a convention, and that all convention is socially acceptable, hence, it uses language to socially program.

A *Strong social constructionism* entity convenes and forms the conventions of consensus reality, a real, human operated set of social programs, whose subjects participate in operating on the "real" to the extent they conform democratically and politely. If its ontology is accused, the pragmatic answer is "read the minutes of the meeting", both because the strong social constructionism is busy creating programs, and because sharing a reality accurately and completely is futile.

Also, in regards to Broadcast History, 'social construction' refers to the way in which the media form has been created. This relates both to its structure and regulation. It's the way that the social media outlet is constructed by our society.

The anatomy of a social constructionist analysis

"Social construction" may mean many things to many people. Ian Hacking, having examined a wide range of books and articles with titles of the form "The social construction of X" or "Constructing X", argues that when something is said to be "socially constructed", this is shorthand for at least the following two claims:

> (0) In the present state of affairs, X is taken for granted; X appears to be inevitable.
> (1) X need *not* have existed, or need *not* be at all as it is. X, or X as it is at present, is *not* determined by the nature of things; it is *not* inevitable.

Hacking adds that the following claims are also often, though not always, implied by the use of the phrase "social construction":

(2) X is quite bad as it is.
(3) We would be much better off if X were done away with, or at least radically transformed.

Thus a claim that gender is socially constructed probably means that gender, as currently understood, is not an inevitable result of biology, but highly contingent on social and historical processes. In addition, depending on who is making the claim, it may mean that our current understanding of gender is harmful, and should be modified or eliminated, to the extent possible.

According to Hacking, "social construction" claims are not always clear about exactly what isn't "inevitable", or exactly what "should be done away with." Consider a hypothetical claim that quarks are "socially constructed". On one reading, this means that quarks themselves are not "inevitable" or "determined by the nature of things." On another reading, this means that our *idea* (or conceptualization, or understanding) of quarks is not "inevitable" or "determined by the nature of things".

Hacking is much more sympathetic to the second reading than the first. Furthermore, he argues that, if the second reading is taken, there need not always be a conflict between saying that quarks are "socially constructed" and saying that they are "real". In our gender example, this means that while a legitimate biological basis for gender may exist, *some* of society's perceptions of gender may be socially constructed.

The stronger first position, however, is more-or-less an inevitable corollary of Willard Van Orman Quine's concept of ontological relativity, and particularly of the Duhem-Quine thesis. That is, according to Quine and like-minded thinkers (who are not usually characterized as social constructionists) there is no single privileged explanatory framework that is closest to "the things themselves"—every theory has merit only in proportion to its explanatory power.

As we step from the phrase to the world of human beings, "social construction" analyses can become more complex. Hacking briefly examines Helène Moussa’s analysis of the social construction of "women refugees". According to him, Moussa's argument has several pieces, some of which may be implicit:

1. Canadian citizens' idea of "the woman refugee" is not inevitable, but historically contingent. (Thus the idea or category "the woman refugee" can be said to be "socially constructed".)
2. Women coming to Canada to seek asylum are profoundly affected by the category of "the woman refugee". Among other things, if a woman does not "count" as a "woman refugee" according to the law, she may be deported, and forced to return to very difficult conditions in her homeland.
3. Such women may modify their behavior, and perhaps even their attitudes towards themselves, in order to gain the benefits of being classified as a "woman refugee".
4. If such a woman does not modify her behavior, she should be considered un-Canadian and as such should not be admitted to citizenship.

Hacking suggests that this third part of the analysis, the "interaction" between a socially constructed category and the individuals that are actually or potentially included in that category, is present in many "social construction" analyses involving types of human beings.

Environmental Leftist social constructionism

The Postmodern social construction of nature is a theory of postmodernist continental philosophy that poses an alternative critique of previous mainstream, promethean dialogue about environmental sustainability and ecopolitics. Whereas traditional criticisms of environmentalism come from the more conservative "right" of politics, leftist critiques of nature pioneered by postmodernist constructionism highlight the need to recognise "the other". The implicit assumption made by theorists like Wapner is that a new "response to eco-criticism would require critics to acknowledge the ways in which they themselves silence nature and then to respect the sheer otherness of the nonhuman world."

This is because postmodernism prides itself on criticizing the urge toward mastery that characterizes modernity. But mastery is exactly what postmodernism is exerting as it captures the nonhuman world within its own conceptual domain. That in turn implies postmodern cultural criticism can deepen the modernist urge toward mastery by eliminating the ontological weight of the nonhuman world. "What else could it mean to assert that there is no such thing as nature?". Thus, the issue becomes an existentialist query about whether nature can exist in a humanist critique, and whether we can discern the "other's" views in relation to our actions on their behalf. This theorem has come to be known as "The Wapner Paradigm."