# CHANGES AND SOCIETAL DEVELOPMENT THROUGH CO-DESIGN IN THE INFORMATION SOCIETY

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## ABSTRACT

Information and knowledge are available all around us as never before. At the same time we experience changes – changes that have a great impact on the whole society, companies and institutions as well as on individual human beings. But changes is nothing new. Already Herakleitos told us *panta rei* – everthing is floating. The changes today is occur however more rapidly than before. Looking at changes from the perspective of an individual human being it is possible to identify two different kinds of changes: internal changes that affects the internal human being and external changes that has an impact on the surrounding world. Internal changes occur when an individual somehow gain new knowledge (learning) and depending on the perspective on knowledge learning occurs in different ways. From a cognitive constructivist perspective the person constructs knowledge on his or her own from impressions from the environment. The social constructivist perspective instead views learning as a result from interaction between people. A person learns by taking part in a social action together with other people and by doing so he can perform tasks that he would not be able to do on his own. Apart from internal change there is also external change and such changes occurs through actions performed by people. But what causes actions? Can internal changes cause actions that will also influence the world? This question is discussed further in the paper. But interaction between people has a further dimension than individual learning. According to Churchman, interaction between people means that different perspectives meet and the more perspectives that we can identify, the better understanding we will get. This idea leads into co-design, where one perspective is that people meet to create something together. Co-design thus take advantage of the fact that several perspectives are present at the same time. The social constructivist perspective does not fully consider the power of co-design. Though the main focus is the social action, the theory still has an individual perspective on learning. Yrjö Engeström has however enhanced Vygotsky's ideas in his activity theory where he sees production as the ultimate goal of human activity. He also stresses that though individual learning through social interaction will mean much for the development of the individual learner, it will not contribute to the development of the society. The knowledge that the person gains is already available in the society. Therefor societal development requires new activities created through co-design. This paper aims at clarifying the relationship between knowledge, internal change, action, activity and societal development. Some models of cybernetic loops illustrating these relationships are presented.

Keywords: knowledge, social constructivism, co-design, learning, action, activity

## INTRODUCTION

Evolution and change have been characteristics for the world ever since the creation of man. Even the primitive man experienced changes through his experiences. He gained knowledge and he changed the world around him using that knowledge to create new tools. The society developed because of the use of the new tools, and the circumstances in the new society served as a base for people to create new tools.

Today information and knowledge are available all around us as never before. Using the Internet we have access to a vast source of information – a source that enables us to gather information from the whole world. Media coverage is almost immediate and we get to know what happens in places far away from us. We are thus exposed by a flow of information that is without parallel in earlier societies. The media of today thus have a great influence on the opinion of people and can therefore serve as mediators of information – information that may cause changes.

The availability of so much potential information in different media has lead to the fact that many people mean that today we live in an information society. At the same time we experience changes – changes that have a great impact on the whole society, companies and institutions as well as on individual human beings. But changes are nothing new. One significant difference between the changes of past times compared with today is however that the changes of today occur more rapidly than before. Human beings, activities, opinions and the society will change more frequently.

Since the character of the society of today includes a vast supply of information as well as a change rate that is higher than ever before, it may be relevant to look further into the relationship between information and change

Information may thus be seen as a driving force for change and the ability to use the accessed information gives power to influence other people and change the world and in that way contributing to the development of the society. The aim of this paper is to look further into the character and cause of individual as well as societal development.

## INFORMATION

If information is considered to be a driving force for change it is interesting to consider the character of information more in detail.The word information comes from the Latin *informare* which means *to give something form*. Information is intended to give the perception of a concept or an activity a form. Information may thus cause changes when introducing new concept or modifying the perception of previously known concepts. Information may be gained through cognitive activities or through activities involving the surrounding world. The system will change according to the information that it receives. Without information there is no reason for and no basis for change.

In everyday life information is generally regarded as some kind of message but that does not correspond very well with the scientific perspective. Many researchers have studied the concept and reached different views of what information really is. Some of them see information as something that can reside outside a human being. Tengström

(1998) for example means that information can be stored on material objects. If so we have to accept that different people interpret the same information differently and what can bring meaning to one person may be totally meaningless to another. Is that in accordance with the original meaning of the word to give the perception a form? If it is impossible for a person to understand a sentence, how could that sentence contribute to his or her perception of a concept? Is it then information or is it something else? Other researchers have regarded information in a different way as for example Mutch (2000) who writes about information as meaning. Checkland and Holwell (1998) think that even if it is important to distinguish between information and data where information is what has entered the human maind and has been interpreted and given some meaning. Ingwersen (1996) is also very clear about the difference between information and data. He says that data communicated to or from machines can never be seen as information. Such data remains data or, at best, potential information.

Michael Buckland (1991) looks at information in three different ways:

- *Information as a thing* that focuses on the physical appearance of the information carrier, as for example a book or the character in a database.
- *Information as knowledge* where information is regarded as enhanced knowledge and in this case has the same characteristics as knowledge.
- *Information as a process* where information is regarded as the action to inform oneself or others.

This is a very wide perspective on information combining two different views, where the first approach, information as a thing, means that information can be stored on material objects outside a human being. This corresponds to for example Ingwersen's concepts of potential information or data. Information as knowledge focuses on the view that information is stored within a human being whereas information as a process combines the two views.

If we adopt the view of information as meaning, data is what we have around us. We are in fact surrounded by an enormous mass of data and if we should pay attention to every single item we would soon become insane. There is no way that we could handle the vast amount of maybe the over 1000 stimuli put to our attention every minute we are awake. (Lewis, 1987) Therefore perception filters the flow of data that reaches us through our sensory organs thus preventing the major part of them from entering our brain.

## CYBERNETICS

When studying individual and societal development it is important to concider the concept *cybernetics*. The word cybernetics has its roots in antique greek and means helmsman. Cybernetics is thus used to descirbe how a system or an activity can be steered towards some kind of goal. The cybernetic control can be authorative and conscious as well as more spontaneous and unconscious. Kelly (1994) suggests that cybernetic control and its characteristic often decides what will happen in a system.

Control means that impulses must be sent to a process with the intention of imposing power to influence the performance of a process. Cybernetics deals with the process of *feedback*, that is responsive information is sent back to a previous stage in an activity in order to modify its performance (Checkland, 1999). Human beings seen as systems are active and self-controlling. (Bertalanffy, 1968)

Cybernetics is thus used to describe how a system can be controlled and steered towards some kind of goal. Information can be the steering mechanism.

## INTERNAL CHANGES

The nature of change has been discussed for at least 2500 years. Already Herakleitos meant the everything is in a perpetual movement and change even if it is not very obvious. *Panta rei*, everything is floating, is an expression that originates from him. He meant that it is impossible for a man to step into the same river twice. Everything changes and nothing remains identical with itself. The river has changed between the occasions and therefore it is not the same river the second time.

A later time philosopher, Henri Bergson, who lived between 1859 and 1941, looks upon life as movement, process and change. He also means that human actions only can be understood in the light of their motives and the motives only if the actions are considered. The characteristics of a human being and his or her actions can not be separated from each other. They are basically two sides of the same thing. Bergson argues against looking at time as a sequence of points on a straight line. Instead he means that the past, the present and the future overlap.

Change seems to have something to do with time. But what is really change? Let me propose the following definition:

*There has been a change when something is not the way it was before.*

Internal changes occur when an individual receives information that can be transformed into knowledge thus influencing the content of the internal human being. That process is referred to as learning. The nature of learning and knowledge has been in focus for discussions for many years. Plato and Aristotele founded two different traditions, rationalism and empiricism, regarding the process of how knowledge is created. These two traditions have served as bases for different perspective on learning and knowledge. (Moreau & Wretman, 2000) Learning can thus be seen to occur in different ways depending on the perspective on knowledge.

### Cognitive Constructivism

Cognitive constructivism regards learning as a process where the learner constructs his knowledge from impressions from the outside world perceived through individual experiences. Increasingly complex mental models are developed when new knowledge is added. Since knowledge is built with personal experiences as a basis, knowledge becomes personal and two individuals can not be expected to possess the

same knowledge. A model showing knowledge creation from the cognitive constructivist perspective is shown in figure 1.

The impressions (data) from the outside world pass through the perceptive filter. The perception is controlled by earlier experiences in the form of mental models. Some of the data will be allowed to enter the brain. According to Checkland and Holwell (1998) these are called capta (captured data) to distinguish them from data that has not been allowed to pass through perception. The perception is controlled by previous knowledge. The symbols (capta) are interpreted using the mental model and the human being then gets information. Some of the information is neglected whereas some information is used for knowledge construction where the existing mental model is changed or enhanced.

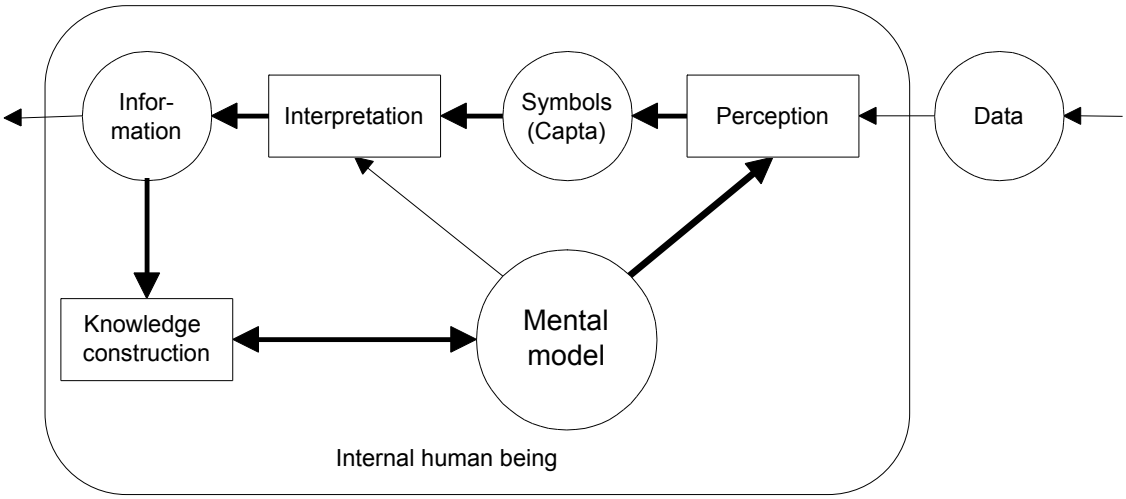


*Figure 1: Knowledge creation from a cognitive constructivist perspective*

Cognitive constructivism assumes that for learning to occur, the individual must be active. Learning is thus seen as an active constructing process where new impressions are actively interpreted into information, compared with earlier knowledge and used to change or enhance the mental models of the learner. Learning in this perspective is thus action based. A passive individual can not acquire knowledge.

The perspective that an individual constructs his or her own knowledge can be used to picture internal changes but it does not however consider interaction between people. Such interaction may however have an important influence on individual knowledge creation and therefore it is necessary to consider alternative perspectives on learning such as for example *Social constructivism*.

**Social Constructivism**

The social constructivist perspective is based on a principle where knowledge is created through social construction. The individual development is influenced by culture and the social context. Interaction with other people is an important aspect for knowledge creation.

Social constructivism has been influenced by Lev Vygotskijs (1986) ideas. He puts a special emphasis on the interaction between people and communication with the environment as important for learning. Vygotskij means that an individual increases his or her knowledge by acquiring new knowledge from other people's knowledge. He defines a zone of proximal development as the difference between what an individual can do on his own and what he can do with assistance of other people. Through social interaction the individual gradually learns to perform new actions and the zone of proximal development is successively moved to a higher level. Through this process the individual experiences an internal change. The knowledge thus achieved is shared between a group of people and is created within a sociocultural context.

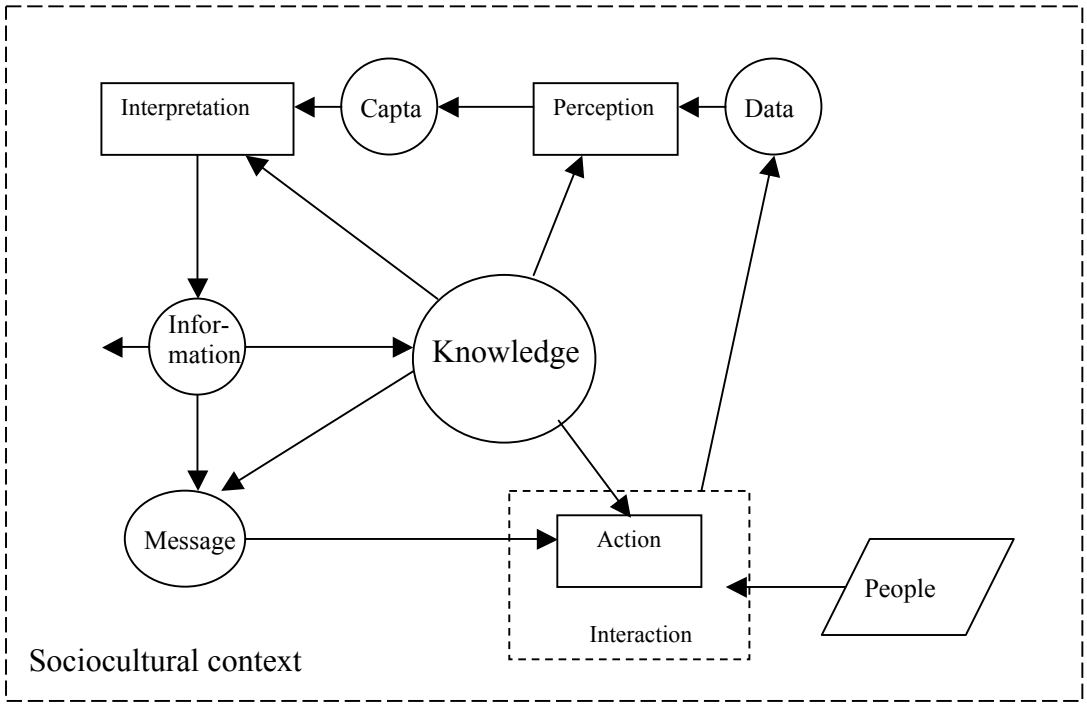


*Figure 2: Knowledge creation from a social constructive perspective*

When a person interacts with other people, he performs actions based on his knowledge. The interaction creates impressions that can be seen as data and some of the data will pass the perceptive filter, capta. The capta are interpreted into information using previous knowledge. A part of the information will not be used at all but will just disappear but some of the information will enhance or change previous knowledge. Some of the information will be used together with previous knowledge to analyze and evaluate what happens in the interaction and that will create a message that will influence the actions of the individual in the interaction. With enhanced knowledge and modified actions the interaction will generate new impressions that lead to new information that will further enhance the knowledge. Knowledge creation is thus part of a cybernetic loop controlled by social interaction – the individual learns by internalizing part of his or her zone of proximal development.

Within the social constructive perspective, knowledge is justified through an mostly implicit agreement caused by social interaction. The view on the world is created within a cultural context and will develop through generations influenced by the culture at the same time as the culture is influenced by the world perception. With this perspective, knowledge can not be regarded as something absolute and objective but can only be valid within the perspective that the society in question has adopted. Knowledge transfer between different cultural groups is therefore hazardous according to the social constructive perspective.

An interesting aspect is the relationship between thought and language. What can be expressed is restricted by linguistic limitations and the interaction with other people therefore seldom fully reflects the thoughts. A question that may arise is weather the internalising process occurs without problems or if the individual adds aspects or refrain from observing some aspects.

## EXTERNAL CHANGES

### Actions

Several researchers have identified an interplay between the concepts in an important triad for learning: cognition – affection – action (Kelly, 1963; Bruner, 1986; Kuhlthau, 1996). Bruner (1986) for example emphasized that it is inappropriate to draw heavy conceptual boundaries around these concepts. They can not be isolated from each other but rather constitute a unified whole. Actions can thus not be seen separately from thoughts and emotions but rather as an external expression for an individual's internal conditions. Actions are means for other people to experience our thoughts and emotions. Actions often reflect a purpose, that is people perform actions to reach a goal. An action can also be seen as a movement since it is an external process caused by an individual. It is through actions that a person can influence and change the surrounding world. To reach full understanding for actions they should be studied together with thoughts, emotions, perceptions, interpretation and context. Actions change the world.

Checkland and Holwell (1998) has presented a process model for how an active person goes from perception to action. The model contains the following steps:

- selectively perceive the world
- give meaning to the impressions
- evaluate the perception
- create intentions for specific actions
- perform the actions

This model can be used to understand the connection between some important concepts. The fourth step is concerned with internal change whereas the fifth step is related to external change. There is of course a relationship between internal change and action. New impressions may create different perspectives that demands an action from the individual. Using the model created by Checkland and Holwell it is possible to draw a picture of this relationship (figure 3):

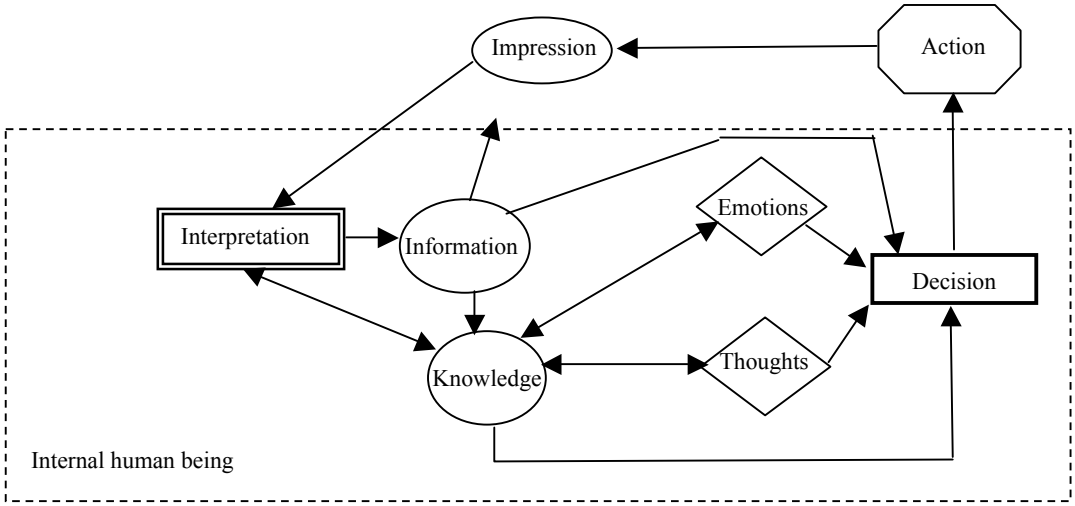


*Figure 3: The relationship between internal change and action*

The action generates an impression that will be interpreted into information using previous knowledge. Some of the information is used to enhance the knowledge whereas other information is left unattended. Based on the information, previous knowledge, thoughts and emotions a decision is made that may lead to an action. Thoughts and emotions are influenced by knowledge. There is here a connection between thoughts and emotions and actions.

There is an implicit cybernetic loop hidden in the figure: the actions will change the world and therefore it will not be the same the next time the person looks at it. The impressions will thus be different and when these are interpreted the information will not be the same as before. The basis for decision has changed and that may lead to other other actions that will further change the world ...

**Societal development**

A serious problem with the social constructivist perspective is that it does not fully consider the power of human interaction. This perspective has difficulties to explain how new cultural development can occur. That a person learns from his or her zone of proximal development according to Vygotskij means that the individual just internalize knowledge from somebody else in the society and that indicates that the knowledge is already present in the society. But already existing knowledge has little potential for societal development. And yet, societies develop otherwise we would all still live in most primitive cultures. So what promotes societal development?

Interaction between people has a further dimension than individual learning. According to Churchman, interaction between people means that different perspectives meet and the more perspectives that we can identify, the better

understanding we will get. Using a systems science perspective we can say that the combined effort of several people working together is greater than the sum of the individual results. the more perspectives that we can identify, the better understanding we will get. This idea leads into co-design, that people meet to create something together. Co-design thus takes advantage of the fact that several perspectives are present at the same time. The social constructivist perspective can not take advantage of the possibilities in co-design. Though the main focus is the social action, the theory still has an individual perspective. Yrjö Engeström has however enhanced Vygotsky's ideas in his activity theory where he sees production as the ultimate goal of human activity. He also stresses that though individual learning through social interaction will mean much for the development of the individual learner, it will not contribute to the development of the society. Therefore societal development requires new activities that Engeström means only can be created through cooperation between people, through co-design. With a focus on societal instead of individual development, Engeström reformulate the definition for the zone of proximal development according to Vygotsky: (Engström, 1987, ch 3)

> *The zone of proximal development is the distance between the present everyday actions of the individuals and the historically new form of the societal activity that can be collectively generated as a solution to the double bind potentially embedded in the everyday actions.*

The concept "double bind" refers to the work of Bateson from 1956 when he and his colleagues presented a learning theory that contained a general description of contraictions that he named *double bind*. In such situations, involved in a intense social interaction, receives two messages that contradict each other. The individual is therefore unable to understand and react to the messages using the knowledge that is available in the society. To solve a double bind situation, it is therefore necessary to create a new activity yet unknown to the society. Engeström's thoughts contains implicitly that this cannot be done by one individual on his own but only through co-design where several perspectives are present.

Engeström sees it necessary to differ between action and activities. An action is something that is related to an individual. The action could be individual or social. In individual actions people use their personal knowledge and skills to perform actions. Social actions means that people interact and that an individual can gain knowledge from his or her zone of proximal development (according to Vygotsky). Activities are related to society, and Engeström means that activities are those instruments that can be used to solve different problems. Societal development thus occur through the development of new activities.

## RESULT

Changes can be seen from different perspectives: changes in the individual knowledge that will lead to individual development, changes in the local surrounding world caused by human actions and societal development. But individual and societal development is not independent of each other. People are part of a society and are influenced of what happens in their environment. On the other hand people also influence societal processes and therefore there is a mutual influence between

individual and societal development. The interplay between individual and societal development is illustrated in figure 4.

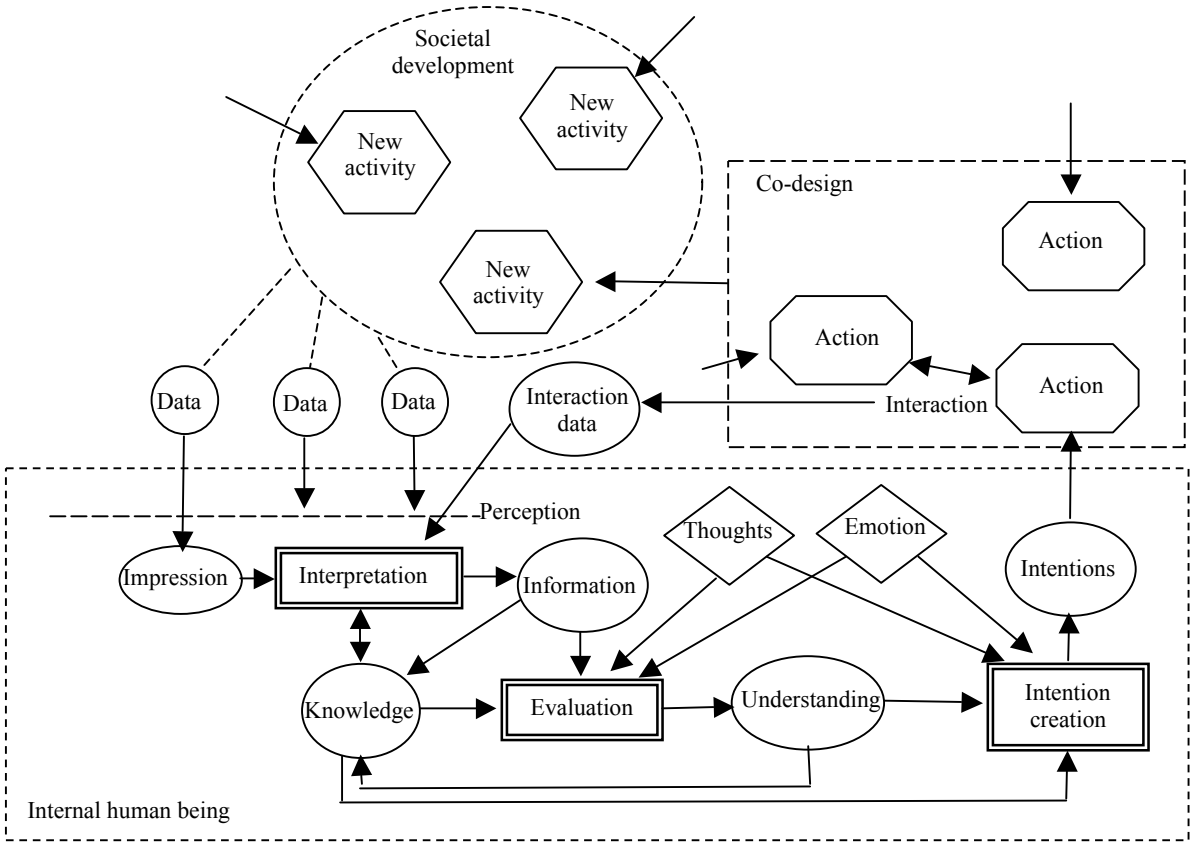


*Figure 4: Individual and societal development*

Data from the surrounding world will hit the perceptive filter. Some of them will be allowed to enter the brain. They will be interpreted into information using previous knowledge. Some information will be used to enhance the individual knowledge thus contributing to the individual development. Some information is evaluated to create an understanding of the situation. The evaluation process is influenced by previous knowledge, thoughts and emotions. The understanding is used (together with thoughts and emotions) to create intentions for actions. The actions can be individual or social. Social interaction may create information from the individual's zone of proximal development and thus enhancing the individual knowledge and contributing to his or her individual development. Sometimes the activities available in the society are insufficient to solve a specific problem. That fact can lead to co-design in order to create new activities. Societal development is caused by several new activities created by different co-design processes.

## CONCLUSIONS

In this paper different kinds of changes have been identified. Changes may lead to development. Individual development as well as societal development has been discussed.

Individual development has been viewed from a cognitive constructivist as well as from a social constructivist perspective. Individual change and development may occur from individual actions where the individual interpret data from the surrounding world to gain information that may enhance his mental models.

Individual development may also occur through social interaction where a person may gain knowledge from his zone of proximal development according to Vygotsky when interacting with other people. This zone will successively move towards more complicated knowledge when a person learns more. This leads to individual development.

To facilitate the understanding of the individual change processes some models have been created.

Human actions cause external changes. A changing world also means different impressions – impressions that may lead to internal changes. Therefore a relationship between internal change and action has been identified. That relationship has been illustrated with a model.

But regardless how valuable individual development is for a specific person, it does not lead to societal development if no new activities are created. Engeström's perspective of the zone of proximal development has been used to argue for co-design as the instrument for creating new activities and thus contributing to societal development.

Societal development has gone on since the beginning of time. Previous generations has created activities that have successively formed our society. When we are involved in co-design processes to create new activities in the society, we contribute to a development to create a new society as it will be known tomorrow.

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