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ISSUE- BASED RESEARCH METHODS VERSUS A SINGLE METHOD FOR ALL SUBJECTS AT HAND

Abstract

Along with the evolution, human kind has developed several methods to reach their goals. Many books and text are written to represent and express diverse ideas about this issue thanks to instinctive curiosity of mankind. These methods can vary from subjects to subjects.

I will treat these above mentioned issue within this paper to exhibit an overview so that we can see all differences and resemblances. Besides this comparing of the research methods I will try to expose some research methods in relation to issue at hand since I believe these methods are partially case dependent besides their general resemblances.

Methods should be based on creative approaches; they ought to be designed to satisfy some norms of performances. These norms must be well defined. When we want to make a research, it is useful to find out the cognitive structure of the objective. Human mind gains knowledge more effectively if he/she uses suitable methods. Subjects may assume this idea as a departure point to develop diverse ways to make research. This paper will explain the inseparable relationship between human cognition, method and research; since the combination of this trio is the keystone of gaining knowledge.

Educators may have varying ideas about methods; yet, in my opinion, common sense would not allow them to think it is probable that one method should be used for all goals. Briefly, if the objectives which do not have characteristic likeness, they may require different research methods.

Finally, I will add some experiential evident to clarify why domains matter concerning research methods in relation to their contents and also the present research methods in education by comparing them with their cognitive structures.

Key words: method, research, education, empirical data, knowledge, cognition.

Human beings have always been using methods to reach their ends. These goals may differ from each other like using methods to learn something or to achieve some goals, or to make a decision and the like. We use methods for efficiency of our mental abilities due to constraints of our cognitive capabilities. It might be also fruitful to mention what method is in the general sense and in that of educational. I mean by method as a way of handling the issue at hand, in the widest sense as Creswell puts it: "Research designs are plans and the procedures for research that span the decisions from broad assumptions to detailed methods of data collection and analysis." (Creswell, 2009: 3)

When we want to apply methods to the domain of education, we should, first of all, understand the characteristics of all essential variables which play roles in it. Considering learning environment, both internal and external, as an example, we should analyze it well enough so that we can adapt our methods to that. Education research methods will also require a great deal of empirical data besides its being included by general methods. There are several sorts of learning methods such as learning by being told, by being taught, by discovery, by analogy, by being instructed, etc. According to Gagne: "Instruction means arranging the conditions of learning that are external to the learner." (Gagne, 1985: 20) It is obvious that external conditions are necessary for learner to gain knowledge; learning can be understood as gaining knowledge. Learning environment should be operate interactively with learner's cognition so that internal learning process get activated. Instructions should be suitable to stimulate learning. Gagne explains it clearly: "In the most general sense, instruction is intended to promote learning. This means that the external situation needs to be arranged to activate, support, and maintain the internal processing that constitutes each learning event." (Gagne, 1985: 20)

We should also understand that learning material can only become knowledge if it is transformed into meaningful state. This can happen after information's being processed into knowable state. Gagne clarifies this very clearly: "In order to enter and be stored in the long-term memory, the material of learning must be encoded. That is, it has to be transformed into a form that is semantic, or meaningful...Encoding, however, is the critical process by which incoming information is transformed into learned and memorable capabilities." (Gagne, 1985: 81-82) Some cognitive scientists state that there are three types of knowledge: 1- Declarative knowledge (knowing what which also has two sub sorts: a-language like representations, b- image like representations), 2-Procedural Knowledge (knowing how), 3-Tacit knowledge (something like implicit knowledge), and 4-Linguistic Knowledge (which is also a kind of Tacit knowledge since even if we can not explain all rules of our native language, we still can use it and can be understood by people who use the same language as his own native one. (Stillings et al. 1998) Although it is not clear distinguish between declarative and procedural knowledge, yet I believe much of our knowledge is declarative as Stillings et al. puts it: "Traditional epistemology distinguishes between 'knowing how' and 'knowing that'. Though this distinction is not the same as the one psychologists draw between procedural and declarative knowledge, the two are closely related. Much of our knowledge- that is probably encoded declaratively, since much of it is mobilized in controlled processes." (Stillings et al., 1998: 369)

Tacit knowledge is very interesting; we can not explain what we know explicitly but it is very effective in thinking, as Holyoak and Thagard puts it: "Implicit knowledge often allows quicker reactions than does explicit knowledge and in some cases is actually more accurate. Moreover, even when explicit knowledge is being manipulated, the process that uses it may itself be implicit." (Holyoak and Thagard, 1996: 21) We should not confuse intuition with tacit knowledge; intuition is a kind of 'built-in' form in our mind which we have it by birth. I think it is a kind of cognitive ability that determines human's first reaction to any kind of data or anything whatsoever so that we operate on those and then we know them explicitly or implicitly. Tacit knowledge is explained further by Stillings et al.: "There is a classical intellectualist suggestion: if an agent regularly employs rules in the integration of behavior, then if the agent is unable to report these rules, then it is necessarily true that the agent has tacit knowledge of them." (Stillings et al, 1998: 371) Do all minds have exactly the same knowledge of anything what they learn, at all? Do we all have the same representations of external (conceptual) objects? I believe most of our cognitive mechanisms are alike, though each of us may have subjective personal ideas of anything. This issue can be represented by a scheme (Figure 1):

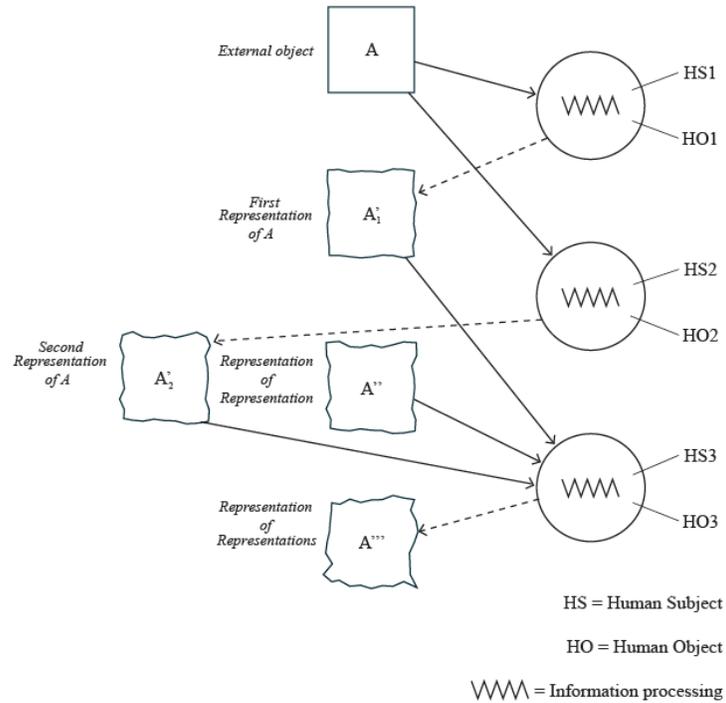


Figure 1. A possible schematic representation of representational mind. (Guney, 2011)

Research methods in education should exploit precedents to gain structured knowledge so that we can refer to them and, by using analogy, we can use them in a creative way. Nevertheless, I will explain more about “precedent analysis” through a chosen method, later on in this paper.

The objectives that we want to treat may have dramatic qualitative differences; they can possess extremely opposite characteristics, like a research method in education and that of in the practice of surgery, or in social sciences. We also need to design the proper methods, for example to make some research or anything else we want to do. Creswell mentions three types of designs in social sciences quite explicitly: “A study tends to be more qualitative than quantitative or vice versa. Mixed methods research resides in the middle of this continuum because it incorporates elements of both qualitative and quantitative approaches.

Often the distinction between qualitative and quantitative research is framed in terms of using words (qualitative) rather than numbers (quantitative), or using closed-ended questions (quantitative hypotheses) rather than open-ended questions (qualitative interview questions). A more complete way to view the gradations of differences between them is in the basic philosophical assumptions researchers bring to the study, the types of research strategies used overall in the research (e.g., quantitative experiments or qualitative case studies), and the specific methods employed in conducting these strategies (e.g., collecting data quantitatively on instruments versus collecting qualitative data through observing a setting).” (Creswell, 2009: 3-4)

However, we must distinguish research methods from research design for their having different underlying characteristics, whatsoever. Research methods are the chosen ways to realize the researches which are intended to be made. On the other hand, research designs are those need to be designed; researchers should design how they want to make research. Creswell describes three sorts of researches for social sciences, explicitly: “Qualitative research is a means for exploring and understanding the meaning individuals or groups ascribe to a social or human problem. Quantitative research is a means for testing objective theories by examining the relationship among variables. Mixed methods research is an approach to inquiry that combines or associates both qualitative and quantitative forms. It involves philosophical assumptions, the use of qualitative and quantitative approaches, and the mixing of both approaches in a study. Thus, it is more than simply collecting and

analyzing both kinds of data; it also involves the use of both approaches in tandem so that the overall strength of a study is greater than either qualitative or quantitative research (Creswell & Plano Clark, 2007).” (Creswell, 2009: 4)

Researchers need a philosophical worldview which determines their approaches and it pervades into the details, as well. According to Creswell there are three components involved in a design research for social problems: “Two important components in each definition are that the approach to research involves philosophical assumptions as well as distinct methods or procedures. Research design, which I refer to as the plan or proposal to conduct research, involves the intersection of philosophy, strategies of inquiry, and specific methods. A framework that I use to explain the interaction of these three components is seen in Figure 2. To reiterate, in planning a study, researchers need to think through the philosophical worldview assumptions that they bring to the study, the strategy of inquiry that is related to this worldview, and the specific methods or procedures of research that translate the approach into practice.” (Creswell, 2009: 5) Further he explains this issue by a scheme(Figure 2):

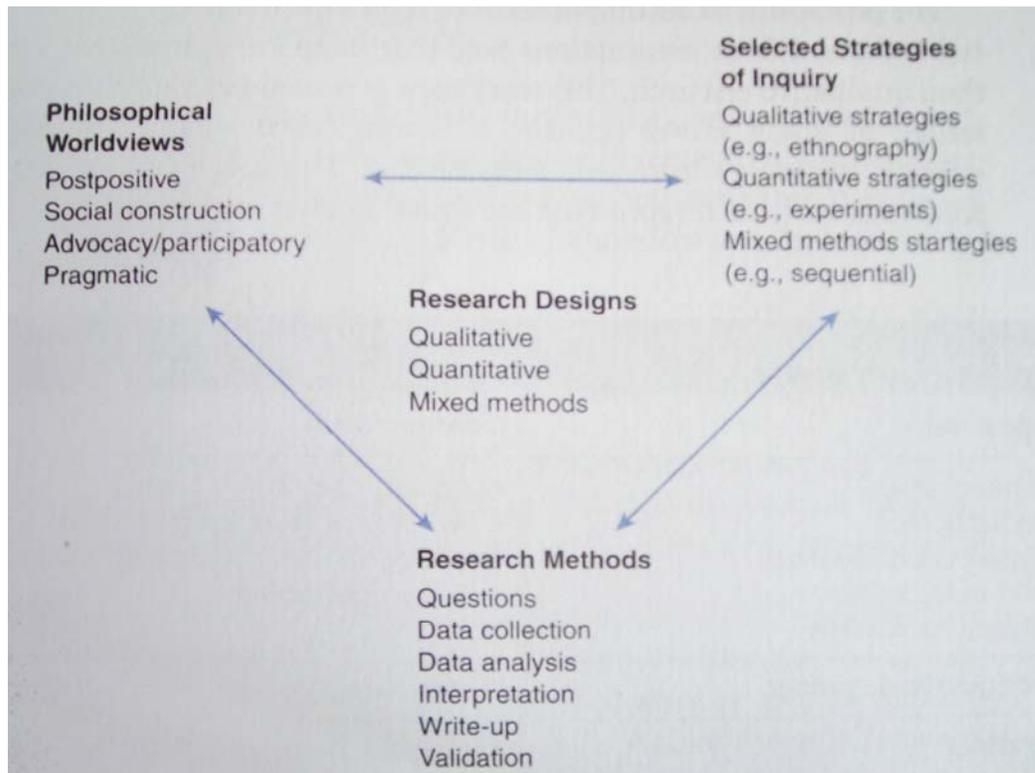


Figure 2. A Framework for Design – The Interconnection of Worldviews, Strategies Of Inquiry, and Research Methods. (Creswell, 2009)

When we look at the question of education more closely, it can be seen also that we need a philosophical worldview, a set of strategies and a set of research methods to design a research program; but again based on the underlying dominant characteristics of the domains at hand, in the qualitative sense; i.e.: Figure 2 is a representation of an analytic domain within which we make relevant inferences. We can, then, use this scheme also for educational research if an objective is analyzed, I think; not if designed. Can we make researches on synthetical domains, then? Is it possible to make a research design for designing education systems? We can do that by following different procedures, methods and strategies in accordance with ‘design domain of education system’; not that of ‘analytical’ one. Nevertheless, we can not design any educational system without analyzing what learning requires and what it is. Motloch explains a kind of combination of the twin: “Since most learning is based on connecting the new to the familiar, education should develop the courage and skills necessary to connect new with familiar, extend existing patterns, and build new ones.” (Motloch, 2001: 35) He suggests also, education system should not flood students’ minds with data, instead; they should develop skills for interpreting information, exploring alternatives, developing insight, and

synthesizing responses. Educators should develop student ability to self-educate and to engage in lifelong learning. (Motloch, 2001) These supporting ideas show also the necessity of analytic domain for synthetic design domain, and also, perhaps, vice versa. Motloch gives an explanatory good example for creative learning of R.Buckminster Fuller, by criticizing American education system for its learning existing knowledge and generating only new data: "...he used knowledge to discover relationships, potentials, and realities, as well as to develop new ideas. By so doing he developed his abilities of insight, and his ability to see failed experiments as 'models to stimulate imagination'." (Motloch, 2001: 36) He supports a holistic education system instead of a Cartesian-based one, since, he believes, systems are integrated wholes whose properties can not be reduced to those of smaller units and also relationships are more important than units by themselves. (Motloch, 2001) I think he is right about this system because of the synchronic and synergic effect of all mental abilities. However, this approach does not exclude the partial learning; we use this method due to the constraints of our cognitive capacity to learn. Besides, we know also, thank to new discoveries about our brain, that when some parts of it is damaged or undeveloped, the other ones take over the task for them; (Motloch, 2001) thus we should support all mental abilities of students as a whole to exploit their entire mental capacity.

This approach has a potential to be fruitful if we take emotions and empathy into consideration; both are prerequisite for internal concentration of learner. Emotions are studied by Ortony et al., in detail regarding cognitive structure of them, but I am not going in depth with it since it is out of this paper's scope; nevertheless, he explains the necessity of it: "Instead we have proceeded on the assumption that progress in psychological research on emotion can be attained through an analysis of the cognitions that underlie emotions." (Ortony, E. et al., 1990: 190) Another very important issue on this matter is 'empathy'. Educator had better have sufficient empathy with students to understand what they really understand from what they teach; they should see what the entire program of education offers is to students. I believe we should not merge our understanding of what we teach with that of learners by trying to imagine what we would do if we had stood in their shoes because it is about their minds, not ours. Goldie puts it in a very clear explanation; read: "Empathy thus involves what is often thought of as 'imagining being X', where 'X' stands for the narrator with whom I empathize. (...);" he disagrees with it and goes on: "...empathy, if successful, does not involve any aspect of me in this sense, for empathetic understanding is a way of gaining a deeper understanding of what it is like for him, not of what it would be like for person with some mixture of his and my characterization." (Goldie, 2000: 178-179) This is a matter of imagining other minds, as an analytic issue and then teaching body should behave accordingly. Concerning philosophy of mind, there are diverse ideas about other minds: "...philosophy of mind- a debate about the source our ability to explain and predict the thoughts, feelings, and actions of others." (Goldie, 2000: 177) Two of them, as Goldie explains, are 'theory theory'- means we have that ability as a tacit knowledge and 'simulation approach'- implies we use our imagination to simulate other mental states. Goldie believes the second one is limited in its scope. It is also more effective, I believe by my own teaching experience, if educators are alert and skillful enough to fight against students' emotional blocks. Teacher should exploit all abilities of students to let them catch-up with their weaknesses by trying to offer them suitable learning environment which can help them in using as many sensory abilities as possible. A supporting idea is that: "Failure to use all our sensory stimuli, is also a perceptual block... Generally, we emphasize the visual the exclusion of other sensory stimuli. But the perception of place can be much richer if the place is designed so that all senses contribute to, and intensify, the experience." (Motloch, 2001: 39) "According to Adams, emotional blocks are perhaps the most inhibitive of all thinking blocks." (Motloch, 2001: 39)

There is another emotional blocking matter which is really preventing minds to act creatively is 'fear of failure'. Educators must fight against this by trying to free learners' minds. Motloch explains this problem very clearly: "Together, the ego and superego introduce an insidious set of emotional blocks. Fear of failure is often the most devastating emotional block... A lack of appetite for chaos is a distrust of left-handed thinking that can result in premature judgment. Complex problems, on the other hand, often require a gestation period of tolerated chaos that the subconscious mind can intuitively weigh variables and discover relevant patterns. Shortening this period can result in poorly conceived solutions." (Motloch, 2001: 39) Besides this dangerous emotional blocking, there is also another one which prevents students to dare to go into chaos. It is more creative if learners do not fear of implicit chaotic learning material or problems to solve, etc. as it is explained by Motloch: "Closely related to an intolerance for chaos is a tendency to judge rather generate ideas. An idea generated but not judged can incubate and cultivate other ideas. Premature judging can eliminate the idea and its seeding tendency. Lack of curiosity results in too little conceptualizing. Lack of access to imagination, or an

undeveloped ability to form and manipulate vivid images, and a failure to distinguish between reality and fantasy, although less common, are equally devastating emotional blocks.” (Motloch, 2001: 39) All these above mentioned blockings stay in the way when learners or decision makers try to reach their ends. They should be wiped out or at least should be lessened. Creative mental behavior can be impeded by these mean impediments as Motloch expresses: “Any of the preceding blocks can function as impediments to effective decision-making. Removing or avoiding these blocks facilitates the consideration of appropriate stimuli, the pursuit of thought processes conducive to creative conceptualization, and the emergence of rich and relevant patterns in the mind’s eye.” (Motloch, 2001: 39) We can summarize his further ideas on this matter as following:

We should develop the ability to incorporate our intuitions and logic together in problem solving; while subjective and intuitive thinking creates chaos besides triggering new patterns and relationships, the rational mind would determine the appropriateness of these solutions. A creative designer is the one who can effectively integrate intuitive and logical thinking. The task of design education is to help the student to develop this ambidextrous, thus creative thinking ability. Before starting the design education in college, the students are equipped with behavioral filters, which indeed can block their imagination. In order to help them to gain creative thinking abilities, design education should first set free students’ minds from these blocks. Appropriate thinking form (visual, verbal or mathematical) should be employed for different situations. A wider perspective is necessary to grasp the problem at hand. If the problem is perceived through a narrow window without having an insight in its overall relations, the solution reached can only address parts of the problem or create more problems. Our mind reduces the amount of stimuli to cope with a situation practically every time. Therefore, to see a familiar situation through a different perspective, in other words defamiliarize it, helps us in noticing parts of it which we miss through our daily sensorial experience. (Motloch, 2001)

Finally, I want to present some “Morphological Design and Analysis” domain methods which I also teach in our faculty of architecture. Before going in depth with these methods, it might be useful to describe what ‘analysis’ and ‘synthesis/design’ are. Guney describes these twin in terms of morphology (conceptual) built artefacts: “Analysis: it is a kind of representation of breaking up a whole into its components on such a way that the elements do not have to be broken down into more ‘unnecessary’ (in accordance with some criteria) details; besides, the structural (syntactic) and semantic relations between components must be preserved and exposed. This “unnecessary details” will lead us to the term ‘morpheme (smallest meaningful unit of a domain)’ in morphological analysis of (architectural or any kind of) design, and Synthesis: bringing the ‘undividable’ (in accordance with some criteria of a domain- morpheme) components into a possible whole(s) within their mutual structural (syntactic) and semantic relationships. This is, of course, a very short explanation of synthesis in general. Later on I will, further, explain what possible combinable mutual structure and semantic are in (architectural or any kind of) compositions through their components or morphemes /and or: combination of morphemes (objects).” (Guney, 2011) Figure 3 is a schematic representation of this complementary process:

Theoretically, it seems possible to assume this twin to be exactly the opposite of each other; yet, they may vary concerning instances since a party may yield a set of parametric alternatives.

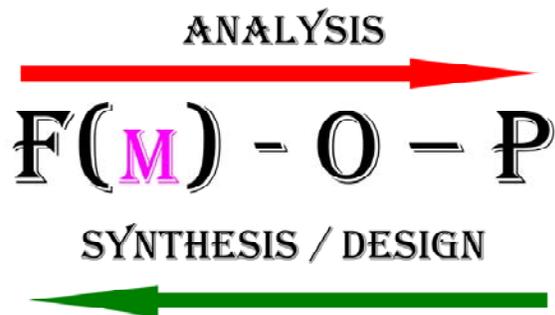


Figure 3. Analytic mental process v.s. synthetic design process. (Guney, 2011)

We use this method in both analytic and design domains in our lessons supported three more methods which analyze sub issues of artefacts (precedents). These are: Ching, Steadman and Clark & Pause which provide morphological data in relation to their relevant scales and aspects; that is to say: one deals with form/compositional aspects, the other physical aspects and parti, and the third one with topological and dimensionless aspects of artefacts to provide the relevant sub-data for F-O-P for that of ‘Analytic’ domain. We represent that knowledge by way of a kind of semantic network; see Figure 4-6. I mean by “Knowledge Representation” as a kind of representation relates data structures to each

other; read Winston: "...a representation is a set of conventions about how to describe a class of things" (Winston, 1993, p 16) and it has four parts: a lexical, a structural, a procedural and a semantic. (Winston, 1993: 19), and "Semantic Net" is one of the representation techniques in which there are lexical, structural and semantic parts besides other ones which are: associational, structured object, formal logic based, procedural, common sense knowledge representations and other approaches. (Brachman and Levesque, 1985)

We analyze precedents to find out the hidden principles which are not obvious if we look at them superficially. We can read a supporting explanation of Vosniadou: "For example, on the basis of readily accessible properties that can be seen, people presumably will not judge whales to be very similar to other mammals not fish, they will probably acknowledge that with respect to some important, although less accessible property or properties whales are similar to other mammals. This observation suggests that restricting oneself to relatively accessible properties may make it difficult to account for the perceived similarity of whales to other mammals. If one can not appeal to "hidden" properties, it is difficult to explain the fact that people might recognize such similarities" (Vosniadou, 2003, pp 179-180).

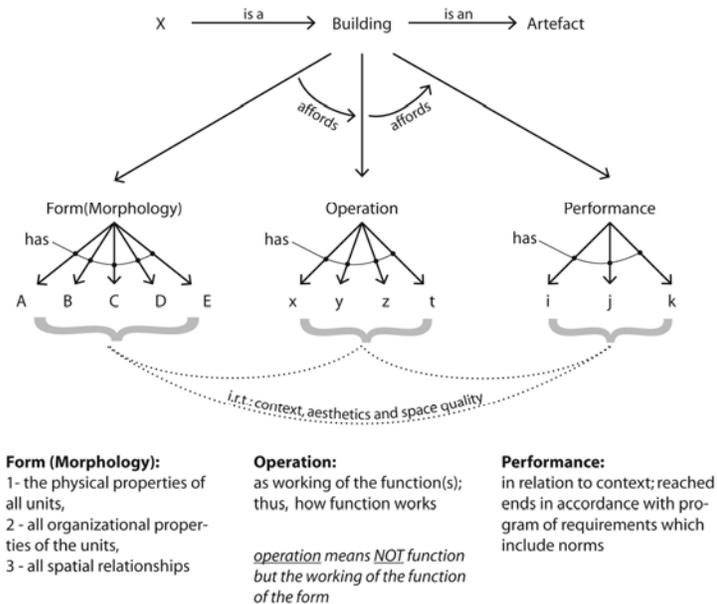


Figure 4. A possible cognitive structure of (architectural) precedent analysis, compare with figure 7. (Guney, 2008)

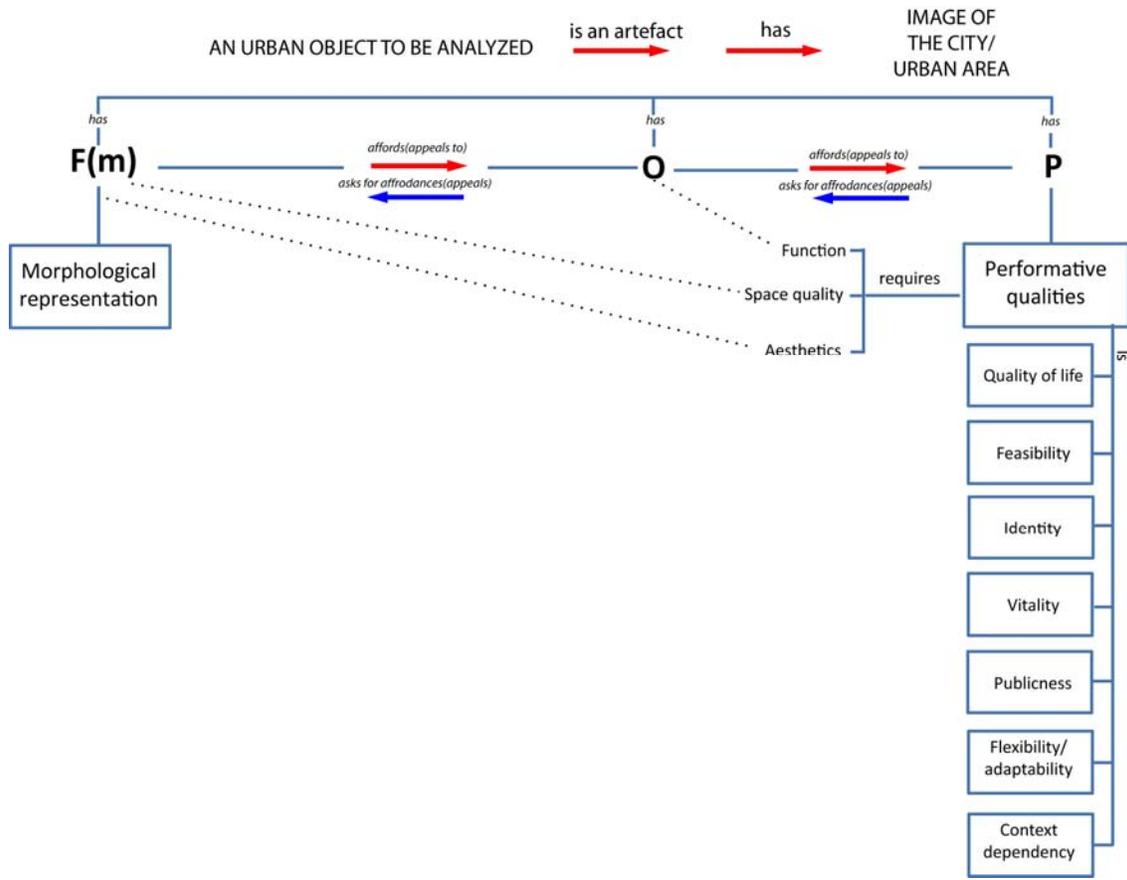


Figure 5. Application of FOP to Urban Design. (Guney, 2011)

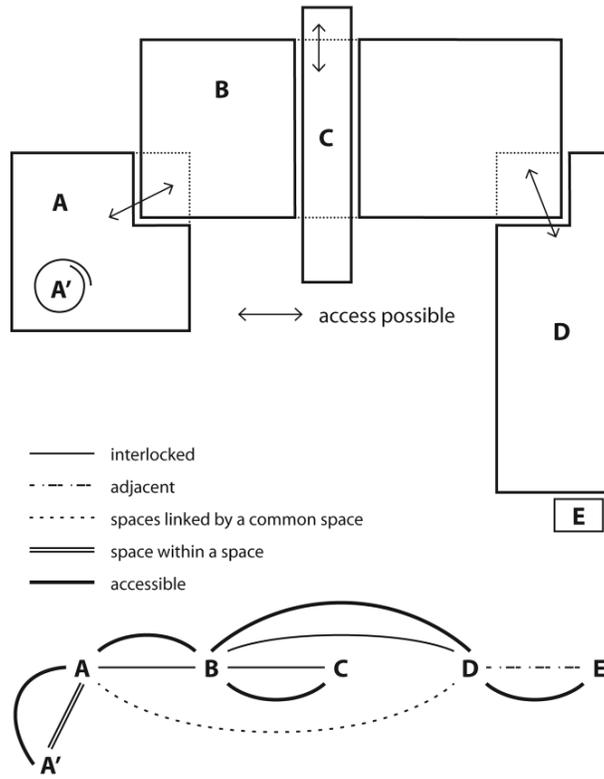


Figure 6. A schematic representation of the major units. (Guney, 2008)

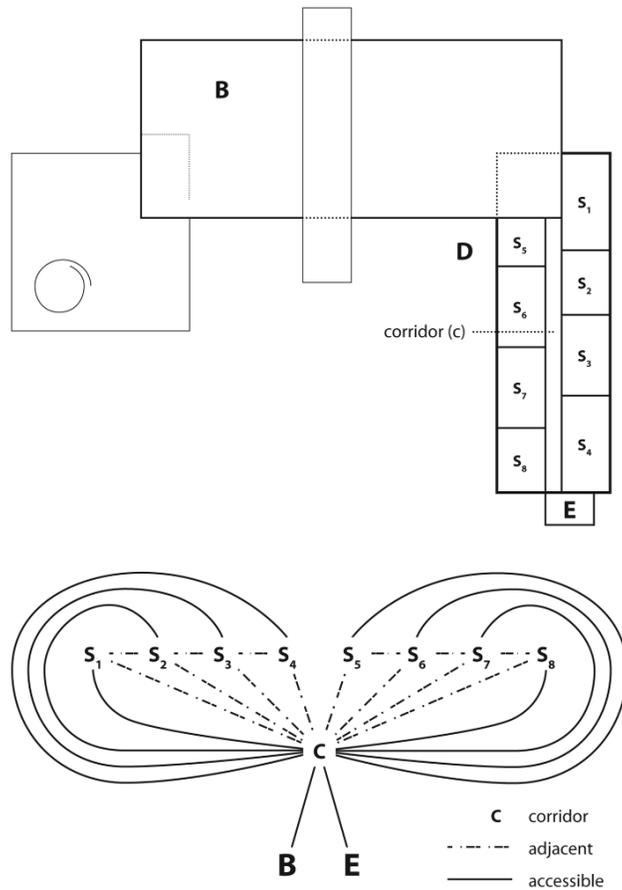


Figure 7. A schematic representation of the minor units. (Güney, 2008)

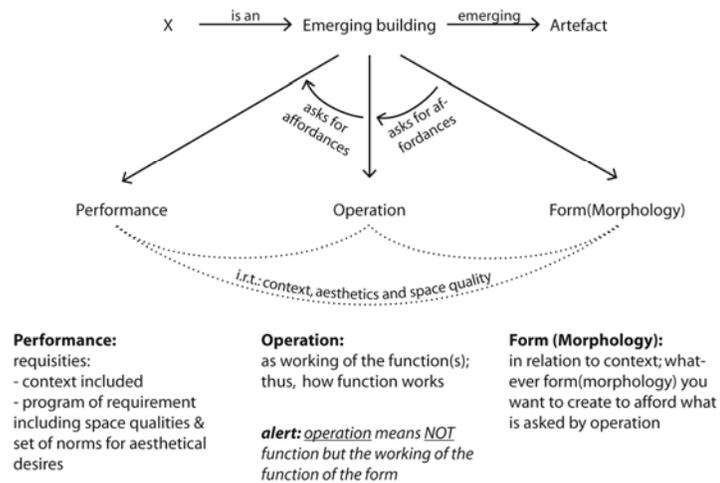


Figure 8. A possible cognitive structure of (architectural) design mechanism, compare with figure 4. (Güney, 2008)

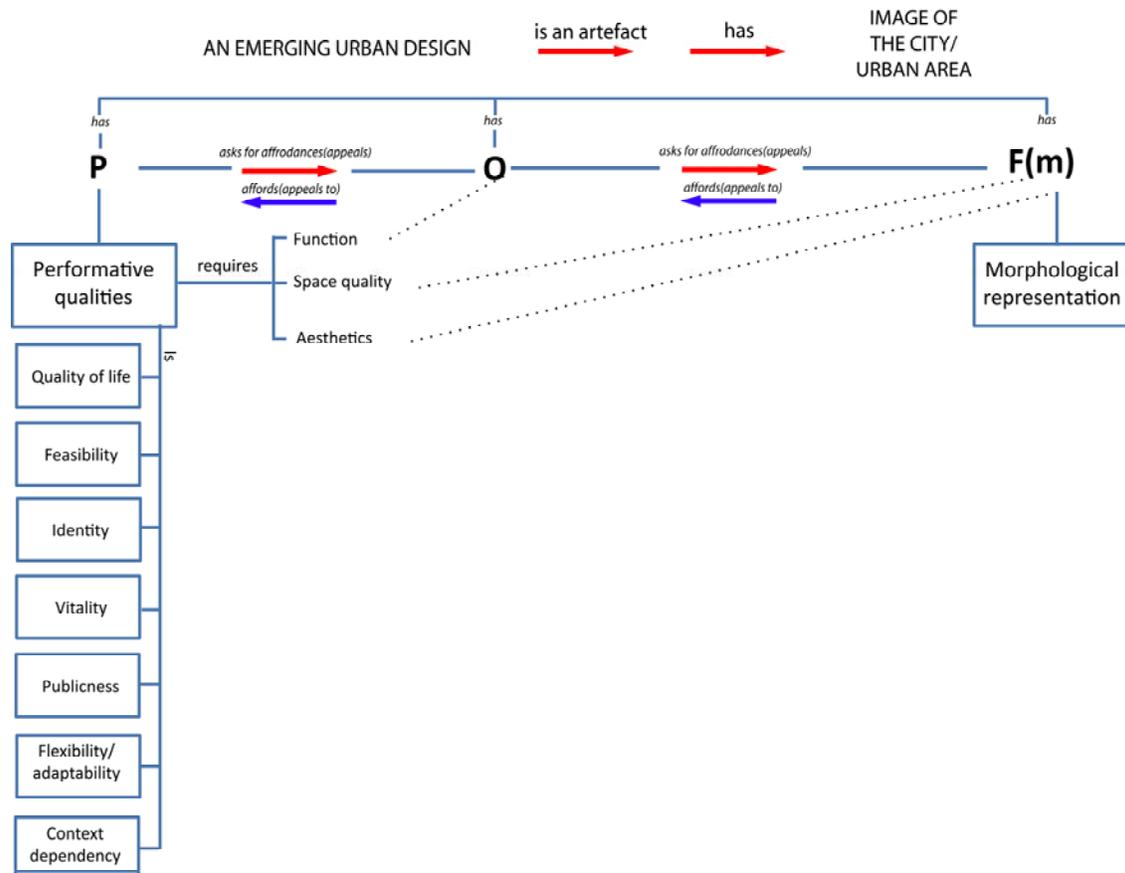


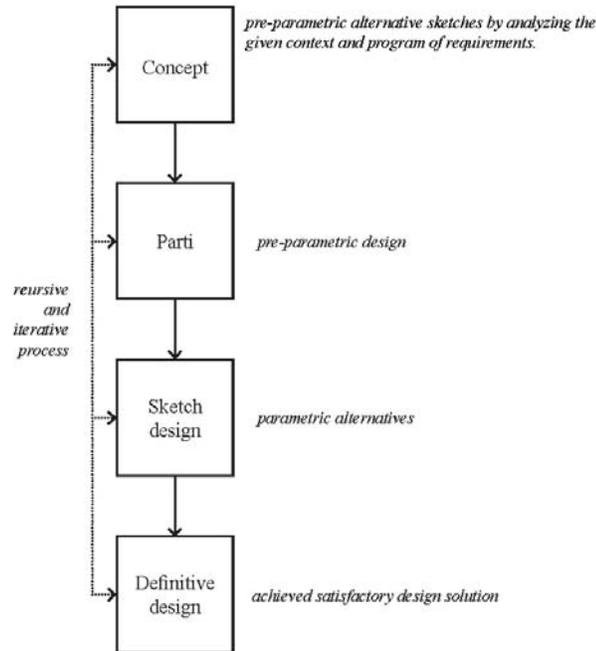
Figure 9. Application of POF to Urban Design. (Guney, 2011)

Explanation: All phases involve consideration: program of requirements, context, background knowledge(including precedent knowledge), design strategies(including design by study and study by desing). All the phases also include POF(M) and creativity.

Parti: dominant underlying characteristic idea

Recursive: 2: of, relating to, or being a procedure that can repeat itself indefinitely or until a specified condition is met.(M.W.)

Iterative: 1: marked by or involving repetition or reiteration or repetitiousness or recurrence.(M.W.)



This is, of course, not a linear process; only a sketch of it and architects break the rules sometimes. Besides, it includes recursive and iterative processes.

Figure 10. Some possible design phases. (Guney, 2008)

Besides all these methods I offer, there is another style of classifying design methods, too; Peter Rowe says designers may use top-down, bottom-up and mixed methods to reach their ends. (Rowe, 1992) Nevertheless, we use all methods by believing their to be 'creative'. It might be fruitful if I expose some question about what creativity possibly be. Creativity, to me, is a kind of complex property having multi facets. These recombinants can be tandem, defamiliarization, circumscribing, mental leaps and analogy. Analogy is a powerful mental activity which can be very effective in creative process. Analogy helps us to create new and more abstract concepts that help to see even more remote analogies and thus help us to see even more abstract concepts (Holyoak and Thagard, 1996). The authors clearly explain this powerful cognitive behavior: "Although the individual concepts in a person's semantic network are important for thought, the full power of human thinking depends on its capacity to combine concepts to create more complex structures." (Holyoak and Thagard, 1996: 24)

Finally, we design how to make research and related methods through philosophical worldviews in relation to the issue at hand which has certain domain(s); thus not only one method for all domains.

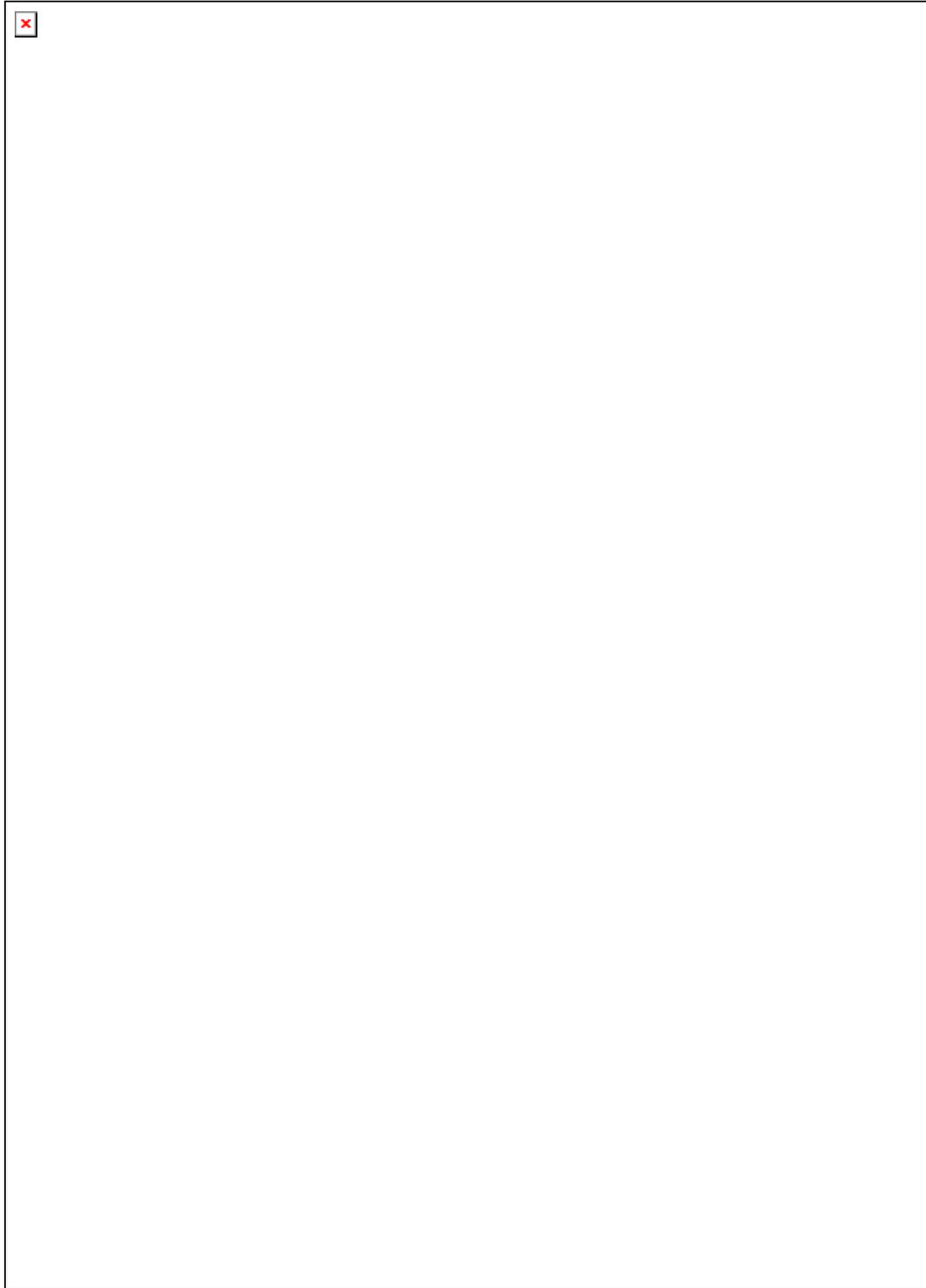


Figure 11. A proposal for Program of Requirements in Urban Design. (Guney, 2011)

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