# Empathic Design for Community Resilience

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Empathic design, which is the outcome of embedding the empathic approach in community resilience, will meet all four critical features of any models which are supposed to satisfy both physical resilience and humanistic considerations. It holds that in addition to the technical knowledge, engineers have to care about the humanistic side of the engineering process as well. Empathic design refers to a design in which the designers, as well as the technical specifications, consider the humanistic aspects of the system in virtue of three types of empathy, namely, cognitive, affective, and conative. The empathic design brings about an inclusive and effective community resilience approach that is human-centric, individual and communal sensitive, justice-oriented, and value-based consistent.

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## 1. Empathy: Definition and Characteristics

Empathy in psychology was considered as a research topic of experimental research in the early 20th century, and since then, it has been explored in several major fields of cognitive, developmental, social, and clinical psychology [1]. The new research on empathy as a major part of emotional intelligence in the late 20th century, however, made it a central concept in some significant psychological and psychotherapist research studies. Recently an increasing number of studies have been conducted on the role of empathy in engineering education [2][3][4][5] and practice [6][7][8][9][10].

In a general sense, empathy means the ability to understand other people's thoughts and feelings as well as the capacity of emotive treatment with them. It is emphasized in the literature that *awareness* is a necessary component of empathy, which distinguishes the concept of empathy from emotional contagion. "With empathy, the observer is aware that this feeling is a result of perceiving emotion in the other. With emotional contagion, the emotion is captured, but the observer lacks this awareness, and the observer believes this feeling to be his/her own" [1]. That is, psychological empathy is a result of a self-reflexive reflection and is not just an incident (Notice that there is a semantical similarity between empathy and some other concepts like sympathy and compassion; however, they are not the same. Sympathy has a more emotive meaning and refers to "a vicarious emotional reaction based on the apprehension of another's emotional state or situation, which involves feelings of sorrow or concern for the other" whereas compassion means "the feeling that arises in witnessing another's suffering, and that motivates a subsequent desire to help" [11]).

According to its origins and functions, *empathy* can be categorized into the following three kinds: cognitive empathy, affective empathy, and conative empathy.

**Cognitive empathy** refers to the study of the ability and accuracy of the understanding of other people's thoughts in different contexts. Empathy, in this sense, is an epistemic tool to help us understand and know what others' minds are [12]. Some psychologists emphasize the congruency of the observer's empathic mental state with the mental state of the individuals who are the object of the empathic treatment, while some others deny the possibility of the complete congruency [1][13][14][15]. However, it is intuitive and largely plausible that cognitive empathy is not only available in some deep levels, but also, it is an indispensable part of our everyday life when we are talking or thinking about other people's thoughts, beliefs, and actions.

**Affective empathy** refers to the study of emotional responses of human beings to the encounter of others' conditions. Affective empathy is usually formed after the apprehension of other people's feelings and problems and sometimes entails some responsive actions. It can be thought of as the middle step, which is proceeded by cognitive empathy and would sometimes be followed by conative empathy, which is a professional and *pragmatic* tool in caring for other people [1][16][17][18]. Affective empathy is semantically close to sympathy.

**Conative empathy** refers to the study of the practical application of taking supportive actions in response to other people's feelings and problems. This kind of empathy is a professional and pragmatic concept, which refers to an empathic treatment with the people (like e.g., clients, stakeholders, or patients) in practice [1][19][20][21][22]. Conative

empathy is the most apparent kind of empathy which would be fully objective and observable. It is also a necessary part of some clinical professions like psychologists and psychotherapists who apply it in assisting their patients. Conative empathy is logically preceded by affective and cognitive empathy. Accordingly, a comprehensive definition of empathy is an affective one which is originated from cognitive empathy and leads to a conative one.

## 2. Empathic Design for Community Resilience

Empathic design leads to an inclusive and effective approach to resilience design which requires to be human-centric, *individual and communal sensitive, justice-oriented, and value-based consistent*. These major expectable characteristics of an inclusive model for community resilience enable turning from the pragmatic approach in engineering design to a more fundamentally epistemic one.

### 2.1 Being Human-Centric

An effective resilience design would be human-centric in two senses, which both require cognitive empathy. First, community resilience has been recently defined in terms of recovering capability of stakeholders, which are affected by disaster and natural hazards [23]. In fact, the concept refers to returning the capability of those affected humans to their initial capability in the pre-disaster situation. Capability itself is modal philosophical concepts, and more specifically, human capability is a psychological term as such. Therefore, a central part of resilience design would be related to the human side, which is in direct relation with the physical and infrastructural aspects.

Secondly, as discussed above, engineering aims at well-being and reducing human beings' suffering. It follows by necessity to consider human beings' real needs and problems, and design in a way that resolves those. Thus, a resilient engineering system should also aim at reducing human suffering, and this goal would be obtainable only if the humanistic sides of systems become "understood" by engineers.

This "understanding of the humanistic side" cannot be attained by implementing empirical approaches. This understanding is not limited to the physiological needs of the individuals; it is rather more relevant to subjective psychological and anthropological needs, other minds' feelings and experiences. Empathy as a "non-inferential and non-theoretical method of grasping the content of other minds became closely associated with the concept of understanding" [12]. Put in other words, cognitive empathy, as opposed to other empirical tools like experiments, has unique features that make a bridge between human subjective feelings, inferences, and interpretations about the outward world. So, a human-centric approach for designing resilient systems requires subjective epistemic tools like cognitive empathy.

### 2.2 Being Both Individual-Sensitive and Communal-Sensitive

Community resilience requires the recovery of the system's performance. It is broadly supposed that the engineering system resilience has to be considered at the community level. Recent studies have suggested that community resilience should consider the specific needs of individuals because the performance of a community is the function of its individuals [23]. However, community resilience is not simply a one-to-one function of its individuals' resilience; rather, there is another concept as communal resilience as well. Thus, the relation between the community and individuals should be explored to realize the resilience feature of a system. The collection and interaction among the individuals sometimes cause the emergence of some patterns at the community level, which cannot be seen just by looking at the individual level. Thus, an inclusive and efficient approach for designing resilient systems requires considering both individual and communal resilience, which both need different levels and kinds of empathy.

From a sociological point of view, there are two major theories on the semantic of the community proposed by Weber and Durkheim. Weber focuses more on individual autonomy in constructing the features of a society. Weberians believe that a community is a function of its individuals [24]. Durkheimians, on the contrary, propose that the features of a society are not equal to the one-to-one features of its individuals. A society is more than a simple aggregation of its individuals. He points out "social facts" as the distinguishing features of a society which are not reducible to individual-level facts [25]. For example, in a soccer team, the team's performance is not equal to the collection of each player's performance individually. The interaction among the team members plays a critical role in the final performance of the team in addition to their individual functions.

Paying attention to the major opposite differences between the two points of view of an individual and a communal level leads us to two important points on the concept of resilience. First, we cannot simply ignore the individual level in community resilience. There is a meaningful interaction between these two levels, and every impact on individual resilience affects the communal level and vice versa. Any inclusive model would meet the needs of each and all

individuals of society and satisfies individual resilience, only if it follows a one-to-one stakeholders' comprehension and communication. Such a model enables both identifying their real needs and problems and foreseeing their future needs in probable disastrous situations.

Secondly, based on the Durkheimian theory of society, we cannot simply take community resilience like a *bijective* (one-to-one correspondence) function of individual resilience. That is, the study of resilience, as one feature of a community, is not equal to study of individual resilience. For example, after a great depression in a society, it is not guaranteed that this communal depression will be removed after a successful recovery of all the individuals of that society, and it may take longer for the community to rebound the connections among the individuals to produce its communal level functions. It might be said that changes in society are greater and more lasting than changes in individual levels, and usually, it takes time to return society to the primary status before a disaster.

Moreover, it is not plausible to only consider one community resilience in each society because there are many sub-communities in a given society. Each sub-community has different values and capabilities, and some have overlap as well. Thus, it seems that any comprehensive model of community resilience must be both individual-sensitive and communal-sensitive and also consider all the major communities in a society.

Being individual-sensitive, which requires consideration of the needs of each and all individuals in the community, is equivalent to the human-centric approach, and therefore requires cognitive empathy, as discussed above. On the other hand, being communal-sensitive requires even deeper empathy. Being communal-sensitive requires two criteria: First, one needs to feel like an individual in that community. Secondly, it is essential to evoke the same feeling of the members of that community and maintain it for a long time in order to enable underrating the social fact. For example, one might understand what it means to be poor in a rich family. In such cases, it is probable that the poor person is not able to afford charges and always needs to borrow money from family members. However, living in a poor community has a different sense, which is not equal to the former feelings. In a poor community, in difficult situations, there is nobody to rely on, and this makes a great difference. Thus, to understand what it is like to live in a poor society, one needs to fully know and deeply experience the same feeling. Empathy provides this chance through *participant observations*. In this method, by applying conative empathy, you would act like a member of that community, and after a while, you will gain the same affections of that community (i.e., affective empathy), and it finally leads to understanding like a member of that community (i.e., cognitive empathy). That is, you need to empathically be involved in those communities and put yourself in their shoes for a while so you can also understand the social- and communal-level facts which are not equal to the individual ones.

## 2.3 Being Justice-Oriented

An inclusive community resilience aims at justice, which can be accounted for in three major moral approaches, all of which require three kinds of cognitive, affective, and conative empathy.

Community resilience is committed to bringing about human well-being, which refers to the well-being of each and all human individuals irrespective of their gender, sex, race, education, financial status, etc. Studies in vulnerability assessment of the communities have revealed that the socially vulnerable population experience higher hardship from natural hazards [26][27]. This has been shown to be rooted in individuals' higher exposure to the threats and their lower ability to tolerate the negative impacts [28]. The social inequities in the societal impacts of natural hazards suggest that current approaches have failed to meet the needs of the affected communities [29]. This highlights the importance of incorporating justice in designing resilient infrastructure systems. Therefore, an engineering system would be resilient only if it aims at justice and equally considers each and all individuals.

Three major moral accounts can be implemented for including justice in the resilience of the socio-technical system: First, Virtue ethics, which emphasize the subjective moral virtues; secondly, Deontology (or Kantian Ethics), which emphasize the duties and universal moral rules (i.e., categorical imperatives); and thirdly, consequentialism (or utilitarianism) which refers to the consequences of actions.

Given that community resilience requires each and all individuals to be helped, there could be three approaches to the necessity of such a humanistic consideration. First, according to Virtue ethics, community resilience has to be humanistic because helping other people comes from the human virtue of being benevolent and compassionate (i.e., referring to an agent's subjective moral character) [30]. Second, Kantian Ethics holds that we must help others because it is a universal moral rule, no matter what the characteristics of the agent are or what the consequence of the act could be [31]. Third, utilitarians believe that it is essential that each and all individuals are considered and assisted in a natural hazard because it ultimately maximizes the well-being of the community [32].

All these approaches highlight empathy in community resilience. The first two accounts lead to the Golden Rule, which says, "Others are to be treated by me as we would wish them to treat me" [33]. This, in turn, leads to conative empathy, which refers to the empathetic treatment of people based on cognitive and affective empathy. They both require human beings to think of other people like themselves, either as virtuous or as a moral duty. Moreover, the last utilitarian account also requires people to treat others fairly and empathetically without considering the actions as a kind of human virtuous or as a moral duty. According to utilitarianism, we need to treat others as we wished to be treated, empathetically, because it finally guarantees our ultimate interests in a social system. It holds that an engineering system would be effectively resilient in the long term, only if it really cares about justice. In other words, equity between individuals ultimately maximizes well-being for all the individuals, including those who are not affected too much by the disasters [32].

## 2.4 Being Values-Based Consistent

An inclusive, resilient system ought to be values-based consistent, while a values-based consistency will be fulfilled by cognitive empathy. It is largely considered that a resilient system has to be adaptive and must learn how to foresee the probable impacts during and after disasters. Foreseeing the potential impacts due to the disasters should be implemented in the engineering of infrastructure systems. However, achieving this objective would only be effectively obtained if it follows a value consistency between the designers and stakeholders. The designers and stakeholders, including both human resources of the infrastructure systems and human users, have different values and conceptualizations which have to be diagnosed, translated into a common language, and compromised. The different interpretation of a problem from different points of view, if not considered, prevents the outcome systems from achieving their objective in meeting the needs of individuals in the affected community. Such inconsistency in the fundamental value-level might cause some additional problems for the resiliency and sustainability of the system. For example, if the designers for local public transportation translate the ultimate goal of the system in terms of "expedition and speed," which is not committed to the "whole accessibility," the system would fail to meet the needs of the users, and this would also negatively affect the social justice.

Value consistency needs an understanding of other minds. Values include some conscious and unconscious concepts and beliefs in humans' minds, which are not necessarily communicated explicitly or correctly between the stakeholders. Discovering the correct formulation of all stakeholders requires the epistemic tool of cognitive empathy. This tool provides engineers with an understanding of the stakeholders' minds to enable them to incorporate those values in the resilience design of infrastructure systems.

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