

Empathy Improvement through Roleplaying Canvas in Education and Innovations

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Abstract

The Gujarat Technological University initiated a movement of learning engineering by applying the approach of design thinking across all the branches through curriculum since the year 2014. The initial efforts were focusing on developing a mindset through a logical process of structured thinking through the introduction of a course “Design Engineering” having a spine across all six of semesters in Degree Engineering of all branches. Later in the year 2016, it was restricted to Semester III till Semester VI considering final year aspects with the inclusion of it under the project works attained by the students in a group. The current paper attempts for fine tuning the overall process by exploring a canvas before empathy mapping stage to improve the same. Empathy for a user’s mindset plays a very crucial part while empathising about one. A Role-playing canvas (RPC) was developed, many students and teachers were exposed to the canvas and reflections from students were received by performing a survey about its effect and impact. The survey results were analysed and explored in the light of responses and are discussed in detail here, and specific recommendations for further suggestive actions are drawn.

Keyword- Design Engineering, Design Thinking, Engineering Education in Gujarat, GTU, Roleplaying Canvas

I. INTRODUCTION

Design thinking is gaining momentum in the business applications, globally [1]. It has been defined as “unified framework for innovation” to “an essential tool for simplifying humanising” [2]. The central thought in the design thinking processes is a user and needs. The needs are visualised using various tools developed in the form of canvases. At the GTU , design thinking as an approach is taught as a course having a spine spread over semester three to semester six (of the eight-semester program) systematically since the academic year 2014-15 for which efforts were initialised in the year 2012 [3]. The core idea of teaching design engineering is to introduce project-based learning among the students and provides a scope to explore technological horizons.

The central thought of GTU for the courses of design engineering is focusing the human-centric approach. A cyclic and iterative process follows through observations, empathy, ideation, product development, prototyping and testing. Fig. 1 illustrates the design engineering process adopted by the GTU. The process steps are iterative as the similar looking steps are repeated and attempted by the students in each of the semesters, however, more and more insightful understanding is built and gets improved in the mindset of the student.

The process steps illustrated above shows it to be a systematic approach. However, each of the steps interacts towards the centre and contributes to building insight into the doer. At present, the students learn the process as 1. Observations, 2. Empathy mapping, 3. Ideation, 4. Product development, 5. Prototyping, and 6. Testing.

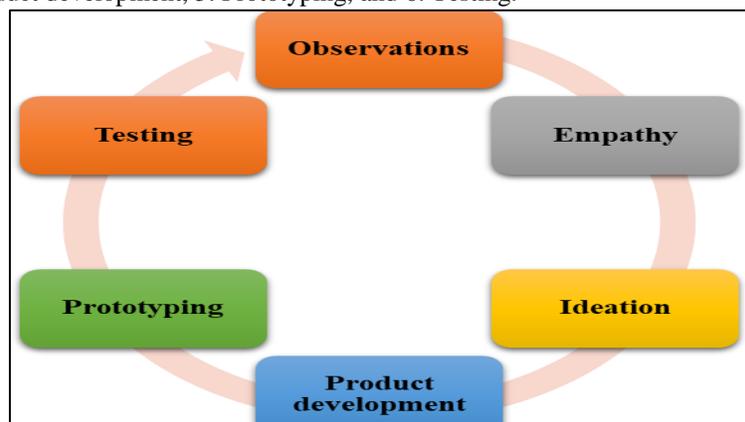


Fig. 1: Design engineering process at GTU [3]

The course is delivered to students in the above manner. The observations include field observations using ethnographic tools. After attempting observations, the stage of empathy mapping is to be performed. Here, the current paper discusses a tool developed for visualising the role of a user through evolved Role-playing canvas (RPC) as a format for utilisation. The RPC was float among the students and faculty members who worked on it prior to the Empathy stage exercise. A survey was conducted of the students, who are still studying in an initial stage and free from any biased thoughts about engineering concepts, to understand the perception received by the students through the RPC.

A. History of Design Thinking

The history of design thinking dates to any innovative thought or out of thinking box application developed ever. However, structured approaches attempted and documented takes it to an American era of the 1960s. Professionals involved in industrial design and product design initiated attempts to distance themselves from engineering and sciences [1]. The Design Science as a case was spearheaded by a great inventor Buckminster Fuller at MIT in the mid of 1950s. His approach was focusing on the natural resources utilisation and non-disruption of ecological processes. Almost at the same time, the Scandinavian cooperative design was also evolving. In this approach, the role of designers was more of a facilitator or guide involving anyone from experts to workers and inhabitants looking forward to involving and using in co-designed products. This service design approach was able to bring a high level of involvement and iterative nature. It could instantaneously bring in discussions begun among all the workshop participants by its mode of presentation and working through designs that acted as provocations of thoughts. Unfortunately, the limitation on the language of Scandinavian designers acted as a barrier resulting in a not well-documented design movement.

By the year 1969, Herbert A. Simon published “The Sciences of the Artificial” wherein he suggested a new range of classification and parameters for designs. His remarkable the then thought was “The engineer, and more generally the designer is concerned with how things ought to be—how they ought to be to attain goals and to function.” [4].

Other remarkable contributions in the design thinking include for the efforts of Victor Papanek (1971) towards integrated anthropology. Horst Rittel (1973) explored for defining design theory while concentrating on design methods. Nigel Cross (1982) attempted for the human-computer interaction. Donald Schön (1983) contributed to the field of organisational learning. Richard Buchanan (1992) drew a path from design thinking to innovation and its application. Liz Sanders (1999) is considered a pioneer in applied design research. David and Tom Kelley (1991) inspired creativity along with Tim Brown, Jane Fulton Suri, Bill Moggridge of IDEO Inc. with their significant contributions. Alistair Fuad-Luke (2002) contributed to Design Activism. Ezio Manzini (2003) put efforts through his works in participatory design for sustainability. Deborah Szebeko (2008) from Britain, remarkably contributed to public sector and NGO’s.

There are many tools, methods and processes adopted and followed globally with variations in the thought provocation order, however, the design thinking has no specific start or end of thought. Once begun, the thoughts keep on looping and lead to refinement.

B. GTU Motive and Approach for Design Thinking through the Curriculum

The process followed at the GTU affiliated colleges are illustrated in the Fig. 2 with a definite start and end points as the approach has study credits associated. The learning begins with an introduction to the design thinking concept and examples. The domain is identified for future efforts by the students; it is mostly dependent on the engineering discipline of the study. Before empathy stage, there is an initial round of observations to be carried out under the domain selected. For observation, the ethnographic framework of AEIOU and interviewing is followed. Also, there lies a degree of freedom for students to choose any other mode that they feel it empowering their observations and making it yet useful.

II. THE ROLE-PLAYING CANVAS

At this stage, the immersion in role-playing exercise is involved. A course abstract cum guidelines of the university, for Design Engineering in the semester III [5] discusses a week-wise activity schedule. There seems to be no specific information about performing the roleplaying activity that becomes helpful to the performer. In some institutes, it has been done in the form of a play where students enjoy fellowship, however, with such efforts, does it become a prior stage task to empathy? If not, it needs to be made compelling in a way that each student performs it sincerely by playing the role of a person whom they have been attached maximum in their life so far. Once an incident is described by a student playing the role of a person, there remains a chance to make a verification on the part of understanding the feelings expressed for the one whose role is being played. With this motive, the authors evolved a canvas with the positive flow of activities oriented for structured thought provocation. On an experimental basis, the RPC (Fig. 3) floated with its concept and usage guidelines among teachers and students prior to performing empathy stage thinking. The discussions related to data collection, analysis and results are in the following sub-sections. Such feedback and yet a more significant level feedback for the effectiveness of the RPC becomes a scope of improvement at present.

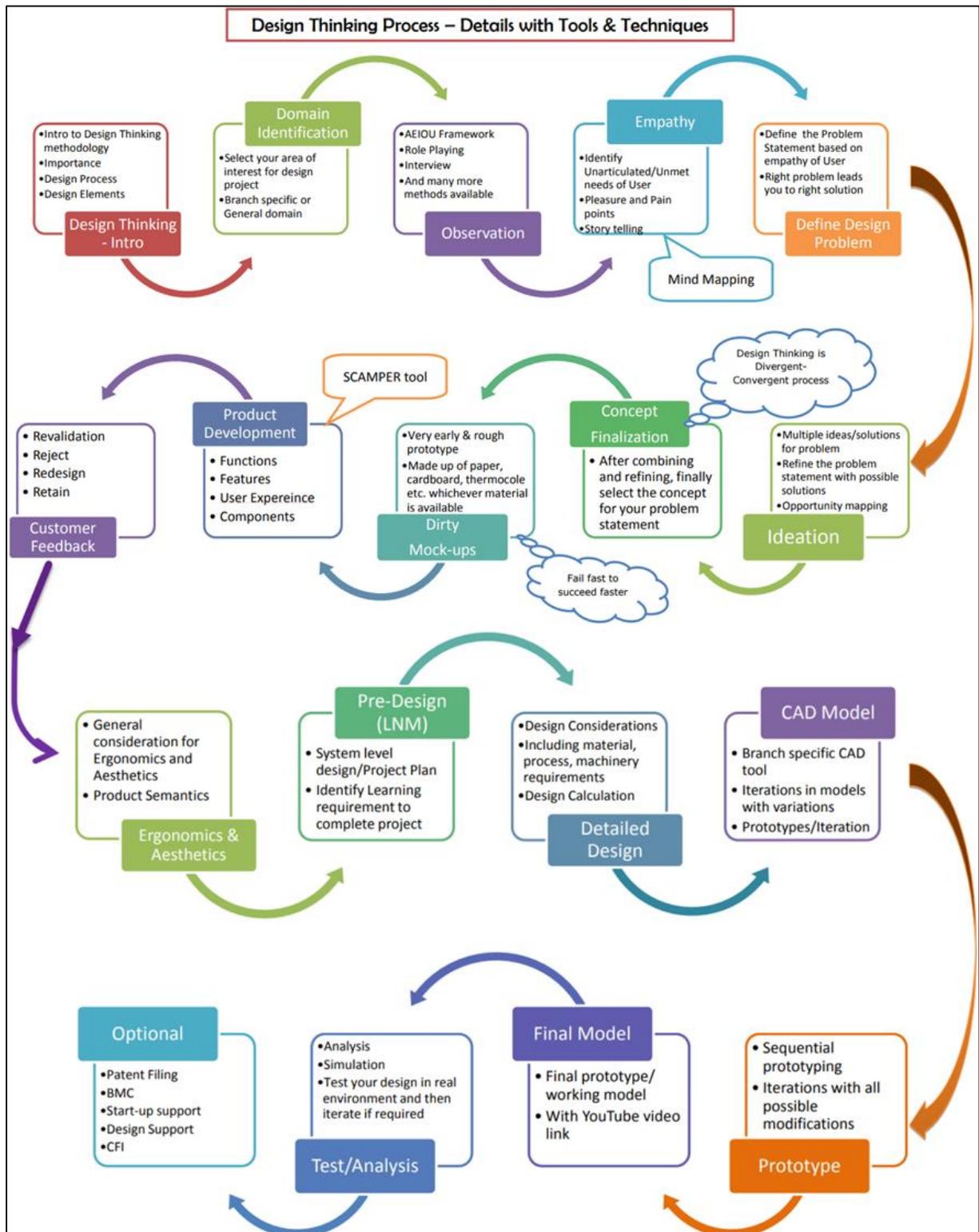


Fig. 2: Design Thinking process adopted at GTU [3] spread across four semesters

The RPC has a flow of structured roleplaying mechanism. The process involves identifying for whom the role is being played (through imagination), what scene is recalled while playing a role (where and when), who else are along (stakeholders) and a detailed description of the incident.

Here, the mental involvement of a performer regarding exploration of feelings becomes most important. To what extent one can indulge in other's mindset while playing a role becomes an essential element. If a performer does it well, indeed it can help one in the empathy and storyboard stage later. It can reveal a certain mindset and detailed insights for the performer which later through empathy, shall help in generating realistic ideas based on the identification of the different level of difficulties.

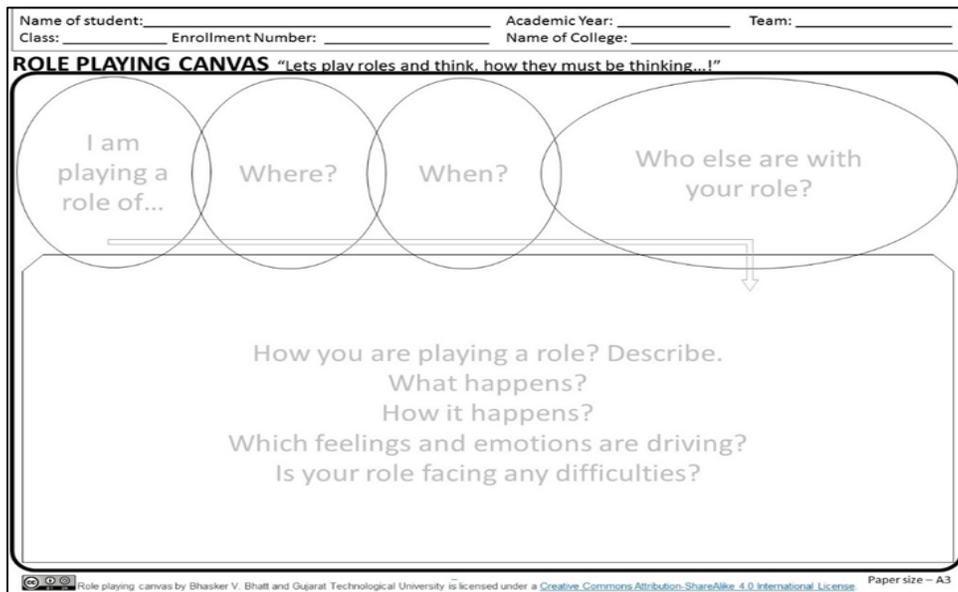


Fig. 3: The Role-Playing Canvas [6]

Students were mentored while preparation of the RPCs at the individual level. Some of the examples prepared by the students are shown in Fig. 4 below.

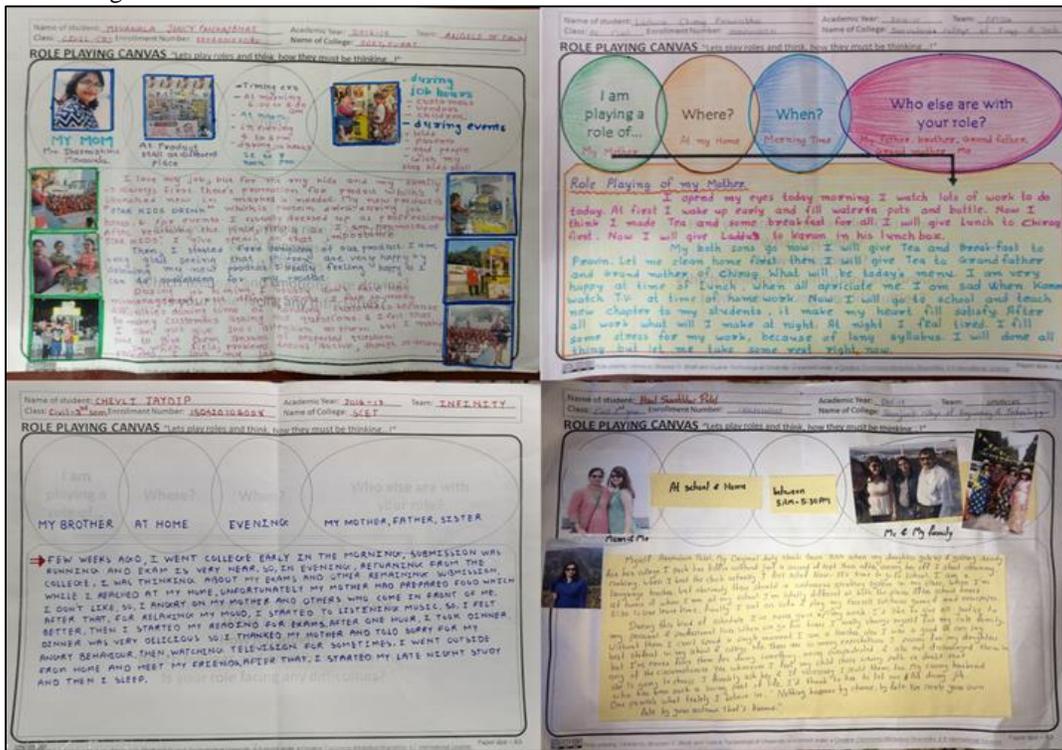


Fig. 4: RPC prepared by students

III. DATA COLLECTION

The responses from the students of BE II Civil Engineering, studying at Sarvajani College of Engineering & Technology, Surat as respondents were recorded using an online survey form.

The survey form was prepared to make an inquiry about the enrollment number of student responding (which indirectly can provide other details for each of the respondents from the institute/ university records). Other questions as mentioned below were seeking opinions about the experience of the performers through an inquiry about:

- Whether the RPC prepared or not;
- The preparation of RPC using what;

- Time spent on RPC preparation;
- Level of difficulty faced for preparation of RPC;
- Perception about the level of confusion/simplicity on RPC preparation process;
- Whose role was played, is RPC helping for better empathy;
- If the RPC was verified with a person for the correctness of anticipated and visualized feelings by the performer;
- If the RPC activity involves fun while making it;
- If any sketches or snaps or alike was used;
- If it can be useful for students at GTU; and,
- Suggestions and feedback from respondent in text form, if any.

Responding to students as mentioned earlier were of BE II, Semester III. These mass of respondent is yet due to learning detailed, and core civil engineering principles hence can be considered as comparatively technical yet with fresh brains able to imagine beyond horizons. As it was an exercise to be performed at the individual level, the whole class of students were involved, and the count was reaching 76 numbers of performer as well as respondent.

IV. ANALYSIS AND RESULTS

Out of 76 students, while the survey was conducted, one student reported of not preparing the RPC by oneself. About 58% of students prepared the RPC by handwriting. Almost equal about 13.5% students prepared the RPC using Handwritten including pasting of snaps, handwriting with sketches/ doodles, and computer typing respectively. Fig. 5 illustrates the RPC preparation mode opted by students.

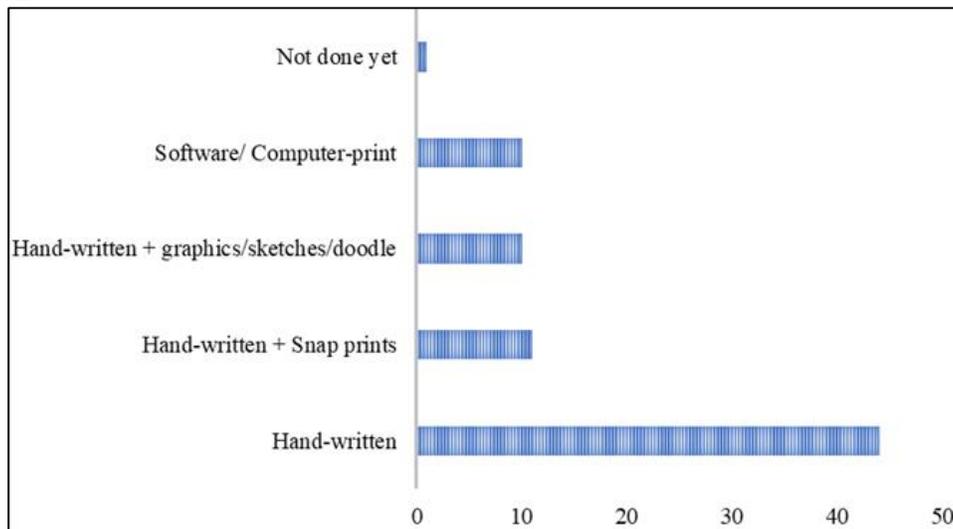


Fig. 5: RPC preparation mode chosen by the respondents

About 80% of students responded that they prepared the RPC within 1 hour or less. About 16% of respondents found the RPC a bit time taking and spent the time of 1 to 2 hours. About 4% of respondents took more than two hours of time to prepare the RPC. Below, Fig 6 illustrates the time spent by respondents for preparation of the RPCs.

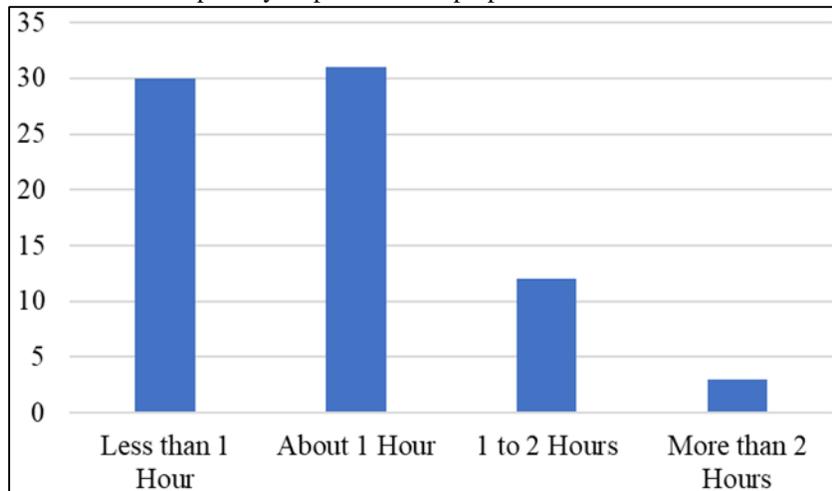


Fig. 6: Time spent on preparation of RPC

A five-point scale was used for identifying the level of difficulty faced in preparing the RPC. The answers were inclusive of Very Difficult-Difficult-Neutral-Easy-Very easy as options for response. While responding to the level of difficulty faced while preparation of the RPC, about 50% of respondents remained neutral whereas about 41% found it to be accessible to effortless. The Fig. 7 below illustrates a graphical representation of the same. In general, it was identified that about 9% of respondents find it difficult to play roles, maybe because these respondents never performed in the past ever. The one who reported negative about preparing the RPC, responded as it was found to be difficult.

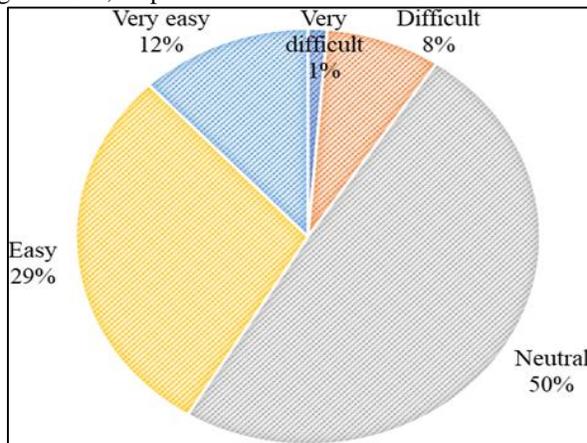


Fig. 7: Difficulty faced while preparing RPC

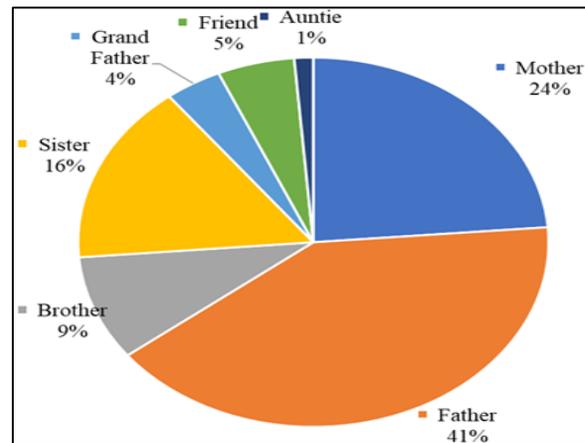


Fig. 8: Character played by a performer

About clarity for working on RPC was sought on a similar five-point scale. The alternative responses to choose from were inclusive of options as Vague & Confusing-Somewhat vague- Neutral-somewhat target oriented-Target oriented (result assured).

| | | The flow of working on RPC | | | | | Total |
|---------------------------------|----------------|----------------------------|----------------|---------|--------------------------|----------------------------------|-------|
| | | Vague & Confusing | Somewhat vague | Neutral | somewhat target oriented | Target oriented (result assured) | |
| Feelings for preparation of RPC | Very difficult | 1 | 0 | 0 | 0 | 0 | 1 |
| | Difficult | 0 | 2 | 1 | 2 | 2 | 7 |
| | Neutral | 0 | 2 | 21 | 12 | 2 | 37 |
| | Easy | 0 | 0 | 5 | 14 | 3 | 22 |
| | Very easy | 0 | 0 | 0 | 4 | 5 | 9 |
| Total | | 1 | 4 | 27 | 32 | 12 | 76 |

Table 1: Flow of working with RPC and level of difficulty faced during preparation

About 68% of respondents felt that the flow of working on RPC was neutral and somewhat target oriented with ease of use. Value of responses was having a mean of 3.66 which states a little higher than the neutral level to respond an experience for the flow of working on RPC. The overall score for the flow of working in the survey was responded to the extent of 73.15% (i.e. 278/380). Below Table 1 states the numbers responded while seeking workflow ease experience.

All the performers were leveraged with a freedom to choose their role model character. Interestingly it was revealed that about 65% of chosen characters were for either of parents. It makes sense to visualise the feelings from expressions of parents, as a best a child may make a judgement for. A distribution of choice made by performers is expressed graphically in Fig. 8. Other characters explored for role-playing were including brother, sister, grandfather, a friend, an auntie and so on.

While responding to RPC as a supporting tool for the empathy mapping exercise, 57 respondents replied affirmatively with 16 on a positive note by uncertain. Whereas a very few, to the extent of 3 respondents felt that the RPC is not much of a use for the empathy process. The response graphical representation is illustrated in Fig. 9 below.

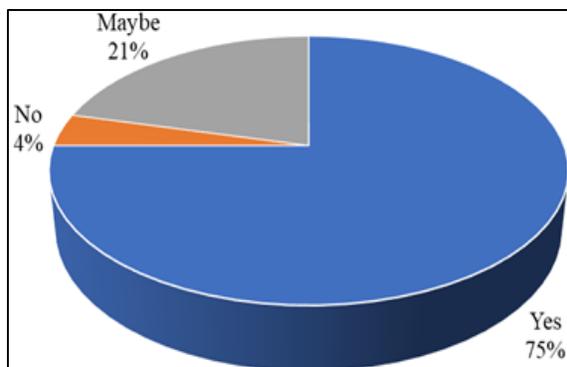


Fig. 9: Responses for RPC support the empathy process

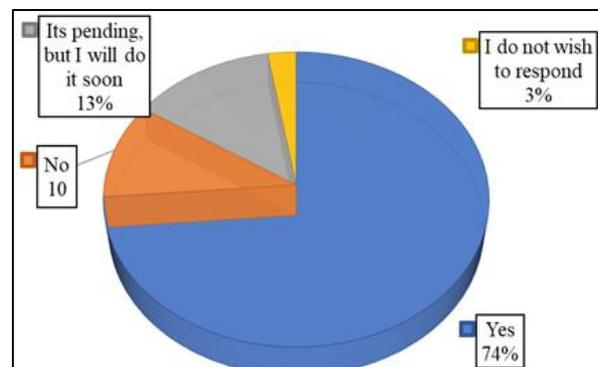


Fig. 10: Validation of RPC by performers

A question sought willingness for checking the performance by the respondent. It was purposefully asked to spark an excitement through validation of the feelings imagined by the performers for the character chosen. As most of the respondents chose people from their first social circle, discussion about validating their visualisation would not be much tricky as a part of a learning exercise. In response to a question, about 74% of respondents were affirmative for validating their RPC and about 13% shown willingness for the validation that was due till then. About 10% of respondents refused to make a validation whereas about 2% denied to response to the question at all. A graphical distribution through Fig. 10 is showing an extent of involvement shown by the performers in the validation process.

Interestingly, only one respondent found the RPC activity as one not having fun preparing. About 85% of respondents identified the activity to be fun-filled exercise. Hence, they felt happy while working on the RPC, being the first-time experience of a kind. About 135 respondents denied an opinion on the question.

In another form of a question, the fun element was cross-examined with a question regarding the inclusion of any sketches/ snaps/ graphics/illustrations on the RPC. Just a little more than a quarter of respondents replied for using these whereas about 69% denied of using any such graphics on the RPC. About 5% did not opine on the inquiry. It seems a bit astonishing for RPC to be fun-filled without graphics, maybe it is an element of excitement towards the exercise for the mass of respondents.

A research hypothesis is assumed as "While performing on RPC, selection of character as a family member (mother or father or siblings) makes the process joyful" and tested. A Chi-square test was performed for the hypothesis. The responses are discussed earlier in Fig. 8 that shows that 65% of chosen character was either of parents. Cumulatively, a 90% of the selected user on RPC belonged to either parents or siblings from family.

| | Value | df | Asymptotic Significance (2-sided) |
|------------------------------|---------------------|----|-----------------------------------|
| Pearson Chi-Square | 28.794 ^a | 12 | .004 |
| Linear-by-Linear Association | .853 | 1 | .356 |
| N of Valid Cases | 76 | | |

a. 17 cells (81.0%) have expected count less than 5. The minimum expected count is 0.01.

Table 2: Chi-square test for RPC character and enjoy ability of working

The Pearson Chi-square examines the hypothesis that the row and column variables in the table are independent. The lower value of "Asymptotic Significance" indicates for, the less likely it is that both variables ('RPC prepared for' and 'was RPC activity fun while working') are independent and would cause for the rejection of the Null Hypothesis as having "no relationship." The output above suggests that character under RPC assumption and RPC becoming fun-filled activity are related (i.e., they are not independent here) since the significance of the Pearson Chi-Square test is far below a usual cut-off point of 0.05. It means that the students/performers should choose for RPC character to be one of the parents or siblings to make the activity enjoyable.

Also, in Table 2, "Linear-by-Linear" test result is shown. It is performed for ordinal (ordered) categories. The test assumes equal and ordered intervals for the variables. A higher value of 'Liner-by-Linear Association' is significant (in range of 0 to 1) that indicates the level of enjoyment increases when parents or siblings are selected as a character (user) for RPC activity given other choices.

On the last note, an opinion in the form of a peer-advice for the RPC is included in the GTU course for a more comprehensive application based on the experience was sought. About 79% of respondents suggested for the inclusion of RPC under the university curriculum as an activity like other activities (canvas preparations for Ideation, product development and alike [5]). About 10% responded in negative and as not wishing to respond to each.

V. CONCLUDING REMARKS

Empathy for an unknown person can be confusing at a first attempt and needs some previous efforts. The proposed RPC can be an excellent alternative to activity based learning before empathy mapping exercise. Considering the experience based results obtained through a survey of performing students, the RPC is advocated by major of the mass. The RPC can help to bring more insightful imagination for empathy exercises over a user. The connections of emotions and situations around a user needs to be addressed for identification of difficulty and exploring alternatives to reduce it. If any of the parents or siblings is chosen as an RPC character (user), the activity becomes enjoyable. Such an attempt at a later stage can spark for innovative products, plans and approaches. Results obtained during the study are motivating and suggested for the inclusion of the RPC as a formal exercise (with evaluation weightage assigned) in the GTU curriculum of Design Engineering courses for degree engineering education. However, more of such a performance experiment may be conducted with a more substantial mass of students as well as teachers to ensure the effectiveness of RPC in future, prior adoption through the curriculum.

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