

The Tenth Anniversary of the CreaRE Workshops: A Look Back and a Look Forward

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Abstract

On the occasion of the 10th anniversary of CreaRE, this paper explains why creativity is essential in requirements engineering (RE). However, not everyone is able to be as creative as needed. So, the research in creativity in RE has focused on ways to help people and groups be more creative in generating requirement ideas. The role of CreaRE has been and must continue to be to allow showcasing proposals and early results in this research. To fulfill this role, CreaRE has published mainly papers about specific techniques to enhance creativity in and for RE and about empirical studies of specific techniques, of comparisons between multiple techniques, and of industrial attempts to be creative in RE. It has also encouraged discussions about creativity in RE through some of its papers; some workshops, panels, and discussions; and some keynotes.

1 Introduction

This year, 2020, marks the 9th incarnation of the CreaRE (Creativity in Requirements Engineering) workshop. Because there are two years, 2011 and 2016, in which no CreaRE workshop was organized, this year is actually the workshop's 10th anniversary. The permanent Website for the series is found at <https://creare.iese.de>, which serves also as the site for the upcoming incarnation. Pointers to the Websites for all of the previous incarnations can be found at <https://creare.iese.de/static/organization/>. On the occasion of this 10th anniversary, it is useful to look back at what has been accomplished with respect to creativity in requirements engineering (RE) and in the workshop itself, and to look forward to what is needed in the future. This retrospective has as a secondary goal to allow its readers to find more information on creativity in RE, either (1) through direct citation of sources or (2) through the permanent CreaRE Website, which contains copies of some slides and links to the published papers and other materials¹.

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¹Thus, you will not find any of the CreaRE publications listed in the bibliography. The purpose of the bibliography is to allow the reader to find the relevant publications. Any CreaRE publication can be found through the links to the proceedings of each past CreaRE workshop that can be found in the "Past Editions of the Workshop" section of the "Organization" page of the CreaRE home at <https://creare.iese.de/>. Note that each CreaRE publication that might have found its way into the bibliography was superseded by a like-titled journal publication that is in the bibliography.

2 Brief Overview of Creativity in RE

It was observed very early by Couger, Gause, Gizikis, Glass, Maiden, McBreen, the Robertsons, Weinberg and others [21, 22, 23, 10, 34, 30, 46, 47, 32, 33] that creativity, the ability to think of new and useful ideas, is essential in RE. Basically, without creativity in RE, there would be no innovation in software development; all new software would implement the same old functionality. It is worth noting that RE [21] has all the characteristics of tough problems [38] that call for creativity, in particular when groups of stakeholders are involved. Therefore, it helps that *all* stakeholders, including customers and end users, are creative about system functionality, and not just the requirements engineers. Finally, creativity gives the hope of attacking what some consider to be the most difficult problem in RE, that of discovering missing requirements, especially tacit requirements and those arising from unknown unknowns [22, 57, 1, 59, 19].

Some argue that every human being is creative, even saying that creativity is what distinguishes human beings from other animals [15, 35]. However, it is clear that some are more creative than others [5], and thus, some are less creative than others. Nevertheless, many believe that creativity is a learnable skill [60]. Indeed, the assumption underneath the drive to develop creativity enhancement techniques (CETs), such as those listed below, is that creativity can be guided through more or less formalized methods [24].

So, the research in creativity in RE has been, and must continue to be, to find ways to help people be more creative about generating creative ideas about functionality and other requirements for the systems they need to build. This work has included and is not limited to

- finding new and more effective creativity enhancement techniques (CETs), such as Brainstorming [42], Creative Analysis [45], Six Thinking Hats [12], Creative Problem Solving [43], Creative Pause Technique [13], Creativity Software [28], and EPMcreate [37];
- improving or optimizing existing CETs such as with Structured Brainstorming [9], Solo Brainstorming [4], and POEPMcreate [49, 50];
- finding RE methods that allow or even encourage creativity in individuals or groups, such as managed group creativity [58], User-Centered System Design [41], brainstormed collective decision-making [56], Collaborative Requirements Engineering [3], Joint Application Design or Joint Application Development (JAD) [61, 11], and creativity workshops [31, 52];
- foundational research about what makes people and groups of people creative, more creative, and less creative [44, 55, 18, 17, 53, 2, 54, 7, 14, 16, 51, 20, 48, 60, 29, 5]; and
- the effects of domain knowledge, or the lack thereof, on creativity [6, 27, 36, 40].

Note that if in a fit of creativity, some new category of work outside the traditional creativity-in-RE box is discovered, it should, of course, be added to this list!

When any of this work leads to proposals for an actionable way to improve the creativity of RE, by making individuals or groups doing RE more able to generate useful and innovative requirement ideas, the effectiveness of the way must be validated empirically in the context of RE processes [39, 8, 37, 62, 49, 50, 25]. This empirical validation requires evaluating the creativity of generated ideas. The basis for evaluating the creativity of an idea is the notion that a creative idea is both new and useful [26].

3 The Role of CreaRE Workshops

I see the role of the CreaRE workshops as being that of fostering this research by providing a forum in which

1. just proposals and early results can be showcased and discussed, and
2. foundational ideas, and what works and what does not, can be discussed.

This work is far enough outside of the RE box, that occasionally, an early paper about a new idea in creativity in RE has been rejected from conferences and journals as being out of scope. For example, an early version of one empirical study of ways to use EPMcreate [50] was permanently rejected from one important RE venue because of one strongly negative review that included the comment

- The term “inventing” requirements is essentially flawed. Requirements are not invented. They are discovered or elicited [sic].

Table 1: Kinds of Work Showcased at Incarnations of CreaRE

Number of instances	Genre	Topic
4	Paper	Empirical study of EPMcreate or enhancement or optimization thereof
8	Paper	CET for RE (other than EPMcreate)
4	Paper	Support for stakeholder (including end user) creativity in RE
3	Paper	Report on experience trying to be creative in RE
1	Paper	Empirical study comparing CETs
1	Paper	Opinion, observation, or proposal about creativity in RE
1	Tutorial	EPMcreate or enhancement or optimization thereof
5	Tutorial	CET for RE (other than EPMcreate)
5	Keynote	Opinion, observation, or proposal about creativity in RE
5	Workshop, panel, or discussion	Creativity in RE

Sadly and ironically, some work on creativity in RE is too creative for the taste of the RE field. Thus, another function of CreaRE is to help educate the RE field about the importance of creativity in RE. Just repeatedly staging this workshop and being visible helps in this endeavor.

4 Brief Assessment of the Impact of CreaRE Publications

Table 1, derived from the “Program” pages found at <https://creare.iese.de>, of the eight past incarnations of CreaRE, summarizes the kinds of work that has been showcased at CreaRE. Most, 12, of the published papers describe specific CETs. Fully four of these 12 are about empirical studies of EPMcreate, one particular CET, and some of its variants. Four of the published papers describe RE methods that support stakeholder creativity. In one such paper, the targeted stakeholder is the end user of the system to be built. Three of the published papers describe experiences of specific industrial applications of approaches to enhance creativity during RE. Five keynotes and one published paper offer opinions, observations, or proposals about creativity in RE. There were also six mini tutorials, each on a specific CET, and five workshops, panels, or discussions about various aspects of creativity in RE.

Six of the 12 published papers appear to have evolved into later conference or journal papers; these six include two papers about empirical studies of EPMcreate. So, the early showcasing at CreaRE and the resulting feedback received during the CreaRE presentation was effective.

These publications seem to have helped researchers build on each other. I know that I have learned from what others in the workshops wrote and said, and what I learned undoubtedly influenced my research.

Sadly, I believe that the papers have had no impact on industry. At least, this is my impression from the fact that I, one of the co-authors of the papers on EPMcreate and its variants, have seen no evidence of any industrial uptake of EPMcreate, the most thoroughly studied of all CETs presented at CreaRE. Nevertheless, this lack of industrial uptake is the norm for academic and research workshops and even conferences. So, I am happy if a workshop or conference helps advance the research and understanding of its subject, as CreaRE has done.

While there has been little, if any, industrial uptake of the CreaRE showcased CETs, three of the published papers were reports of experiences trying to instill more creativity in industrial RE. These papers have informed at least me, and perhaps, other researchers, about what is really needed to foster more creativity in industrial RE.

5 Conclusion

The eight incarnations of the CreaRE workshop have reliably provided a venue for presenting early versions of research on improving creativity in RE, in particular for presenting descriptions of and empirical evaluations of various CETs geared to generating requirement ideas. Even though there is no evidence that the workshop has had any industrial impact, the papers, keynotes, panels, and discussions have helped researchers move in fruitful directions, and in some cases to move papers to fully refereed conferences and journals. Therefore, my view is that the CreaRE workshop has done a decent job of fulfilling its roles in its first 10 years, and it must continue to do so in the coming years.

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