"Innovation? Yes, I Can"–Individually Perceived Creative Self-efficacy as an Effect of Vividness Targeting Creativity Methods

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Abstract. The purpose of the paper is to explore the individual perceived creative self-efficacy as an effect of creativity methods, which target vividness, within the context of teaching innovation processes in higher education as well as in business context tested in the field. The three creativity methods which are investigated, are concepts and prototypes developed based on key ideas of design, tailored to the experimental design. Our approach is founded on a practice-based school of innovating. Three User case studies are conducted amongst interdisciplinary Master students, who are mostly employed at small and medium-sized enterprises (SMEs). The gained experiences and results from the case studies are reviewed by a questionnaire and report experience, e.g. the perceived creativity scored according to the Torrance Test of Creative Thinking (TTCT), Vividness and Creative Self-Efficacy.

Keywords: Human factors · Innovation · Design methods · Creativity

1 Introduction

In this paper we explore how several creativity methods, which target vividness, effect individual perceived creative self-efficacy within the context of teaching innovation processes in higher education as well as in business context. The three creativity methods which are investigated, are supported concepts and prototypes developed based on key ideas of design, tailored to the experimental design tested in the field. Those treatments are intended to reduce inhibitions to innovate, increase the creativity of the participants, and therefore their creative self efficacy.

2 Theoretic Background

2.1 Creative Self-efficacy

Creative Self-Efficacy is "a construct tapping employees' belief that they can be creative in their work roles" [1] and describes the relationship to creative performance.

J. Spohrer and C. Leitner (Eds.): AHFE 2020, AISC 1208, pp. 17–21, 2020.
https://doi.org/10.1007/978-3-030-51057-2_3

2.2 Creativity

According to Groeben [2] today, Creativity is mostly understood as a "special quality of problem solving, which, … is basically available to all individuals … as a development opportunity". Accordingly, one focus of research is on environmental variables that may be beneficial or detrimental to the development of Creativity. This results in four major sub-areas of creativity psychology. Theory modelling: product (criteria), process, person and environment [2]. In our paper, we look at the interaction of person and process.

2.3 Self-efficacy

Self-efficacy [3] refers to "self-related cognition (self-concept) for assessing one's own ability to implement measures to cause consequences" [4]. In the context of motivation theories, self-efficacy is described as "generalised conviction or specific expectation in the best possible way" [4]. In the context of motivation theories, self-efficacy is seen as "generalised conviction or specific expectation in the best areas or situations to promote desired results with one's own behaviour" as an essential prerequisite for the motivation to act [4]. Four factors effect Self-Efficacy: Performance Accomplishment, Vicarious Learning, Verbal Encouragement and Emotional States. Self-Efficacy engenders a special behavior and performance. We focus on Performance Accomplishment and Emotional States. "I can" as a prerequisite for "I do".

2.4 Vividness

The "vividness effect" has been studied in social psychology regarding the clarity of information and its effect. According to the "classic" definition of [5], information can be de-scribed as "vivid" if it is

(a) emotionally stimulating,
(b) concrete and challenging (imagery-provoking),
(c) and is close in sensory, temporal or spatial terms.

What is striking about the concept of vividness and the associated research is that

1) there is mainly laboratory research on the subject and very little field research,
2) the operationalization of vividness proves to be complicated time and again, as already problematized by Taylor and Thompson [6]. What information is Vivid and what requirements result from this for the design of Vivid information? According to a common hypothesis, pictures are more vivid than text, but some studies based on this hypothesis have not been able to prove a vividness effect.

On the one hand, there is a need to clarify the basic concept of vividness for a theoretical framework in which the vividness of information could be investigated, and a need for further field research on where this work should start. In the context of the research work, appropriate treatments need to be developed and tested in the field.

2.5 Method

The definition of a method used within the paper describes "[a] well-specified repeatable procedure for doing something: an ordered sequence of goal-directed operations" [3] on a general domain level, providing "a recipe for action based on a specific purpose and specific values".

3 Design/Methodology/Approach

Our approach is founded on a practice-based school of innovating. The concept of the methods are based on the concept of vividness and also on key ideas from design, particularly design research, and target creative self efficacy.

User case studies are conducted amongst interdisciplinary Master students, who are mostly employed at small and medium-sized enterprises (SMEs). The experimental groups applied the methods to an ideation phase during a creativity process for solving a task and compare the experiences and self-perceived outcomes with the method to regular courses. The gained experiences and results from the case studies are reviewed by a questionnaire, e.g. the perceived creativity scored according to the Torrance Test of Creative Thinking (TTCT) [7] and Vividness and Creative Self-Efficacy is questioned here. Moreover the participants of the mastercourse "consume less– create more" wrote reports on their experience, which we analysed.

3.1 Creativity Methods

Association Memory. Afirst attempt was realized within the concept "Association Memory" [8], in which a multi-phase creative process with convergent and divergent phases as well as text-, image- and object-based elements was operationalized in a playful way. The 20 participants were asked by questionnaire afterwards about their experiences regarding their perceived creativity scored according to the Torrance Test of Creative Thinking (TTCT).

Storytelling Class. After a 15-minutes lecture on storytelling, the 24 participants created their own stories telling important aspects of their current project in 3 steps within teams of 3–5 students. The stories were presented to the whole class in roleplay or storyboard. We observed the students during the process and asked for their experience with the method.

Master Course "Consume Less, Create More". We began with lectures and discussions on Maker Culture and sustainability, where the criteria for the further process were set. The main part took place in the makerspace of our university. 11 students had the task to create a usable item through upcycling and using tools technologies of the makerspace.

4 Findings

4.1 Findings Association Memory

As described before [8], the analysis questionnaire responses revealed that the participants benefited from using the method during their creative process regardless of their former experience with creativity methods in general. Some students considered the creative potential to be more valuable, others were more focusing on the fun aspect of the game and of the prototyping– regardless of their semester being high or low [8]. The clear objective was also largely positively regarded besides the open-ended outcome and "the head starting to associate" [8]. Unconventional and free thinking was granted by the method, to the participants' statements. The perceived Innovative Capability with the method "Association Memory" per self-assessment ranged from low through medium to high, but tended to be high "[8]. One of the reasons indicated most frequently for a lower perceived capability are doubts, that the generated ideas can be utilized in the following steps of the design process, which was not an integrated part of the game. The students described the Variety of their output with the method "Association Memory" as predominantly good, only 2 of them considered the Variety to be low. But a greater number of students were confused by the question or by the term "Variety". Two mentioned, it was difficult for them to write down many associations, most highlighted the variety of associative chains, which they had with the method.

The Fun aspect was significantly highly rated by nearly all the students, only one of 23 participants didn't enjoy the workshop according to our questioning. One person especially liked the prototyping, one was appealed by the variety and originality of the ideas generated by the whole group [8]. 8 of the participants said, it was "most creative" part of their studies, even they had no confidence in their creative performance at all before.

4.2 Findings Storytelling Class

The students said, they had surprising insights in their topic with the methods, they had a lot of fun and surprisingly less inhibitions to draw and roleplay. One student used the method successfully afterwards to empathize with the users of their process.

4.3 Findings Master Course "Consume Less, Create More"

We began with lectures and diskussions on Maker Culture and sustainability, where the criteria for the further process were set. The main part took place in the makerspace of our university. 11 students had the task to create a usable item through upcycling and using tools technologies of the makerspace. In their experience reports the students wrote, the workshop, which was very practical, was fun and they were very confident about their projects and learning skills in using tools and technologies to make their products.

5 Conclusions

This paper reveals that several creativity methods which are based on high level of vividness, increase the creativity during innovation processes and also increase a higher level of self perceived creative efficacy. A coach or teacher can gain knowledge and inspiration for applying creativity methods within the innovation process targeting creative self efficacy. Especially for people with less experience in creative processes might lose their inhibitions to get involved in innovative processes with unconventional methods. Moreover the paper offers in its findings possible criteria and requirements for digital services which support co-creation integrating customers.

Originality/value
There is a lot of research about creativity itself on the one hand and there is a multitudinous variety of creativity methods in practical usage. First results with new methods in reliance on those tested in the field are examined to criteria of creativity, experience and creative self-efficacy.

References

1. Tierney, P., Farmer, S.M.: Creative self-efficacy: its potential antecedents and relationship to creative performance. AMJ **45**, 1137–1148 (2002). https://doi.org/10.5465/3069429
2. Groeben, N.: Kreativität. In: Wirtz, M.A. (Hrsg.) Dorsch – Lexikon der Psychologie. Abgerufen am 18.03.2020, von (2020). https://portal-hogrefe-com.ub-proxy.fernuni-hagen.de/dorsch/kreativitaet/
3. Bunge, M.: Philosophical Dictionary. Prometheus Book, Amherst, New York (2003)
4. Heinecke-Müller, M.: Wirksamkeitsüberzeugungen, Selbstwirksamkeitsüberzeugungen. In: Wirtz, M.A. (Hrsg.) Dorsch – Lexikon der Psychologie. Abgerufen am 18.03.2020, von (2020). https://portal-hogrefe-com.ub-proxy.fernuni-hagen.de/dorsch/wirksamkeitsueberzeugungen-selbstwirksamkeitsueberzeugungen/
5. Nisbett, R.E., Ross, L.: Human Inference: Strategies and Shortcomings of Social Judgment, p. 45. Prentice-Hall, Englewood Cliffs (1980)
6. Taylor, S.E., Thompson, S.C.: Stalking the elusive "vividness" effect. Psychol. Rev. **89**(2), 155–181 (1982)
7. Torrance, E.P.: The Torrance Tests of Creative Thinking: Norms-Technical Manual. Personal Press, Princeton (1974)
8. Pieper, L.: Association Memory: prototype and evaluation of a new creativity method in the context of divergent and convergent approaches for application in business as well as a teaching concept. Naples Forum on Service 2019, Naples, Italy (2019)