A Software Process Line for Combinational Creativity-based Requirements Elicitation

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Abstract: The need for innovation and appreciation of creative solutions has driven requirements engineering researchers to investigate creativity techniques to elicit useful and unique requirements. Some techniques are based on the combination of ideas (requirements, words or problems) that generally come from different sources and are carried out in a process that involves different roles. However, how can we identify the common core and which variations can be adapted to the organizational context where the technique will be used? This article presents a Software Process Line (SPrL) to elicit requirements based on combinational creativity. This SPrL represents commonalities and variabilities found in some combinational creativity techniques thereby it helps teams to define the combinational technique according their organizational context. We validate this approach by discussing how the SPrL is aligned with three techniques that have already been used in experimental studies and produced satisfactory results.

1 INTRODUCTION

Requirements engineering is the process of finding out the purpose of a system by identifying its stakeholders and their needs, as well as registering this information in a way that enables its analysis, communication and subsequent implementation (Nuseibeh and Easterbrook, 2000). However, in some situations it is hard to identify how to improve the systems or how to make them competitive. This identification process is even more difficult when it comes to a new product or an unknown market (Saha et al., 2012).

Thus, creativity can be considered a success factor for organizations and industries. Sternberg (Sternberg, 1999) defines creativity as "the ability to produce work that is both novel (i.e., original and unexpected) and appropriate (i.e., useful and adaptable to task constraints)". In the requirements engineering context, the definition of creative requirements as innovative and appropriate (Maiden et al., 2010) is also used and the strategic importance of creativity and innovation for software development is highlighted.

Among the creative requirements elicitation techniques, we have focused on those based on combinational creativity, such as the framework defined in (Bhowmik et al., 2014). This framework proposes the creation of new requirements from word pairs (verb, noun) combined in an unfamiliar way. These pairs are extracted using a flow that involves social network analysis, natural language processing (NLP) and similarity analysis. They carried out an experiment showing that the proposed framework is able to generate creative requirements.

Later works (Pinto et al., 2015; Pinto, 2016) modify the process proposed by (Bhowmik et al., 2014) defining the following changes: these works did not use social networks and similarity analysis; they diversified the source of the texts that originated the words; they varied the way they choose the words with NLP; they allowed the requirements engineers (REng) to add, modify or delete, manually, the set of words; and they diversified the number of stakeholders, as well as their location and profiles. Even with these variations, the experiments that they carried out showed that it was also possible to create new and useful requirements.

Therefore, there are several ways to extract and combine the elements that make up the elicitation strategy. Moreover, the organizational context influences directly the variations that will be applied

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when using this type of technique. Thus, using combinational creativity to carry out requirements elicitation may require great effort from requirements engineers (REng) since they have to identify what should be considered and what can be varied.

This work proposes a Software Process Line (SPrL) for requirements elicitation using combinational creativity. We mapped tasks and variabilities that were defined in previous works to facilitate the use and adaptation of this kind of technique to the organizational context in which the software will be developed. These variabilities provide greater flexibility for the REng to instantiate the model to a specific situation. Our SPrL enlarges the possible combinations, however it does not try to exhaust all possibilities.

The remainder of this paper is organized as follows. Section 2 cites some creativity techniques and the software process line concept. Section 3 defines a software process line for combinational creativity-based requirements elicitation and how to instantiate it. Section 4 presents the similarities between this SPrL and experiments previously carried out and presented in the literature. Finally, in section 5, we present general conclusions and future works.

2 BACKGROUND

The software industry has been encouraged to develop innovative products to stand out from their competitors and attract new customers (Lemos et al., 2012). This way, the industry tries to identify unexpected satisfaction factors (Kano et al., 1984), which are those system properties that stakeholders do not know of or do not expect to find and that are usually discovered when using the system. Creativity techniques are most suitable to come up with these factors (Pohl and Rupp, 2011).

Creativity can be defined as a mental process involving the generation of original and innovative ideas (Nguyen and Shanks, 2009) and can be classified as exploratory, combinational or transformational (Boden, 2004). In requirements engineering, this classification varies with the techniques and heuristics used (Maiden, 2013). In the exploratory creativity, creative requirements are obtained by exploring the possibilities in a search space delimited by rules and tasks constraints specific to the software. The combinational creativity is achieved by making unknown connections between known requirements in a familiar environment. That is, it is characterized by using known solutions in an unlikely combination. Transformational creativity, in its turn, is performed by challenging the search space restrictions, exceeding this restricted space.

2.1 Creativity-based Elicitation Techniques

There are different approaches to stimulate creative thinking during the requirements elicitation process, such as: conducting requirements workshops (Maiden et al., 2004); performing the EPMCreate (Elementary Pragmatic Model Creative Requirements Engineering Technique) (Mich et al., 2005); conducting the elicitation process based on the integrated collaboration between technologists and users (Yang-Turner and Lau, 2011); using Design Thinking (Vetterli et al., 2013); and using approaches that combine words to create new requirements (Bhowmik et al., 2014; Pinto et al., 2015; Pinto, 2016).

These later works use natural language processing (NLP) algorithms to find relevant words in information sources, which are then used as input for participants to elaborate ideas.

These techniques can promote the understanding of the client's implied expectations (Lemos et al., 2012). They have a common goal, but they are very different when considering the way that they are carried out. Therefore, they require hard effort from the REng who needs to understand the existing possibilities and how the organizational context influences them.

Given the diversity of creativity-oriented elicitation techniques, we realized the importance of having an abstract model to organize and cover the common points and the existing variabilities. Thus, we modeled the combinational creativity-oriented elicitation as a software process line, i.e. a process that has different characteristics that will be selected (instantiated) according to the existing context and REng´s goals.

2.2 Software Process Line

A software process can be defined as the set of activities required to design, develop, implement and maintain a software product (Fuggetta, 2000). These activities may require resources, as well as consume and/or produce artefacts and adopt procedures while they are being carried out. Artefacts are software products that are consumed or produced during an activity (Falbo et al., 1998).

Software Process Line (SPrL) is the integration of concepts that comes from software process and software product lines (Rombach, 2005). Depending on the organizational context, software processes must be distinguished presenting variabilities and commonalities (such as software product lines). The goal of a software process line is, therefore, to guide software engineers in their development tasks (Aleixo, 2013), by defining these commonalities and variabilities, i.e., what is mandatory and what is alternative or optional. The organizational context is characterized by its goals, available people, processes and artefacts, as well as by the features of the project that is being developed.

The feature model represents variabilities and commonalities of a process family. It is a tree structure that represents associations between features as follows: (i) Mandatory – features that must be in all instances of the process; (ii) Optional – features that may or may not be in each instance; (iii) Inclusive – at least one of the associated features must be in the process; and (iv) Alternatives – only one of the associated features (Ataide et al., 2012) must be in the process.

3 A PROCESS LINE FOR ELICITATION

Our SPrL defines an elicitation process based on combinational creativity. It models the fundamental characteristics of this type of process and points out those that can be adapted according to the context or experiment being carried out. Thus, the contribution of the SPrL is to make clear and organized variabilities and commonalities of this type of technique, making it easy to develop new techniques or adjust the existing ones to a specific context.

This modeling approach consists of two models: (i) a process model in BPMN notation, which (abstractly) defines a sequence of activities, their inputs and outputs and the roles played, shown in Figure 1; and (ii) a feature model, which hierarchically organizes process features, indicating the possible combinations, as illustrated in Figure 2. In addition, a third document defines how features and process elements are associated, as well as which are the implications and constraints between features.

3.1 Process Model

As shown in Figure 1, the elicitation process begins with a planning phase in which the REng should: (i) define the element sources – the element sources are artefacts or repositories chosen by the REng to serve as source of information from which elements (e.g. words, ideas, requirements, figures) will be extracted. These elements will be used by the stakeholders as input for the creation of requirements; (ii) select elements – i.e. pick a set of elements that inspire stakeholders. Usually, this set is not very large and its elements should be organized into categories; and (iii) define criteria for requirements elaboration – in which the REng decides which combinations the stakeholders can make with the available elements.

After that, in the execution phase, stakeholders play a key role that includes: (i) creating new requirements – in which they will analyze the available elements and propose ideas (or sentences) that represent new requirements, according to the

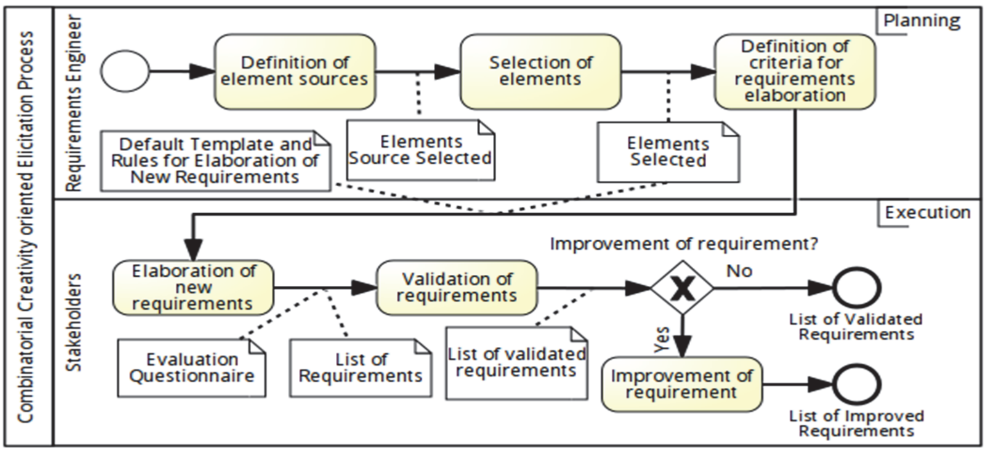

Figure 1: A combinatorial creativity-oriented elicitation process.

specified criteria; (ii) validating requirements – in which stakeholders must evaluate if the requirements are in accordance with the creativity criteria defined by the REng; and (iii) improving requirements – this is an optional activity, its goal is to consider the possibility of carrying out another elicitation process based on the requirements that have already been found. The process ends with a list of requirements for the system.

This process is abstract to generalize common activities of any elicitation process, particularly those that are related with the planning phase and are based on combinational creativity. The activities of this process are characterized by the feature model, in Figure 2. Therefore, the process alone does not represent a process line, the feature model is an essential part that complement it.

3.2 Feature Model

The feature model shown in Figure 2 begins with an abstract item that represents the entire elicitation process. This item is decomposed in an optional feature, the "Improvement of requirements", and five mandatory features, which are: "definition of element sources", "selection of elements", "definition of criteria for requirements elaboration", "elaboration of requirements" and "validation of requirements". These features are directly related to the activities that have the same denomination, shown in the elicitation process (Figure 1) and explained below.

Definition of element sources – This feature refers to the choice of information sources from which elements (e.g. words, ideas) will be extracted. These sources are tangible artifacts that mandatorily consist of: (i) kind of media that represents it, whether it is represented by texts, images, video or audio; (ii) what is their relation with the system, whether they are directly related (named internal source) such as the system documentation (e.g. vision document, use cases) or are foreign (named external source) to the software's purpose, extracted from a general and open source (e.g. news website and social networks, podcasts, music, advertisement lectures); or a combination of both. In these cases, all concrete features (the leaves) are alternative because more than one of them can be selected.

Some organizational questions that influence this choice are: software documentation is enough rich? Is it necessary complement the documentation with some external source? Which kind of media do the sources use? How distinct from those coded should be the new ideas? Which subjects should the new ideas deal with?

Selection of elements – This feature refers to how the elements are selected and which types of elements should be made available to stakeholders to create requirements. Thus, the following sub-features are mandatory:

(i) elements classification, which depends on the previously chosen media: if are texts, they can be classified according to grammatical categories (i.e. verbs, nouns, adjectives); if they are images, video or audio, they can be classified according to their content or style (e.g. for images: abstract, real, objects, graphics; for video: advertising, news,

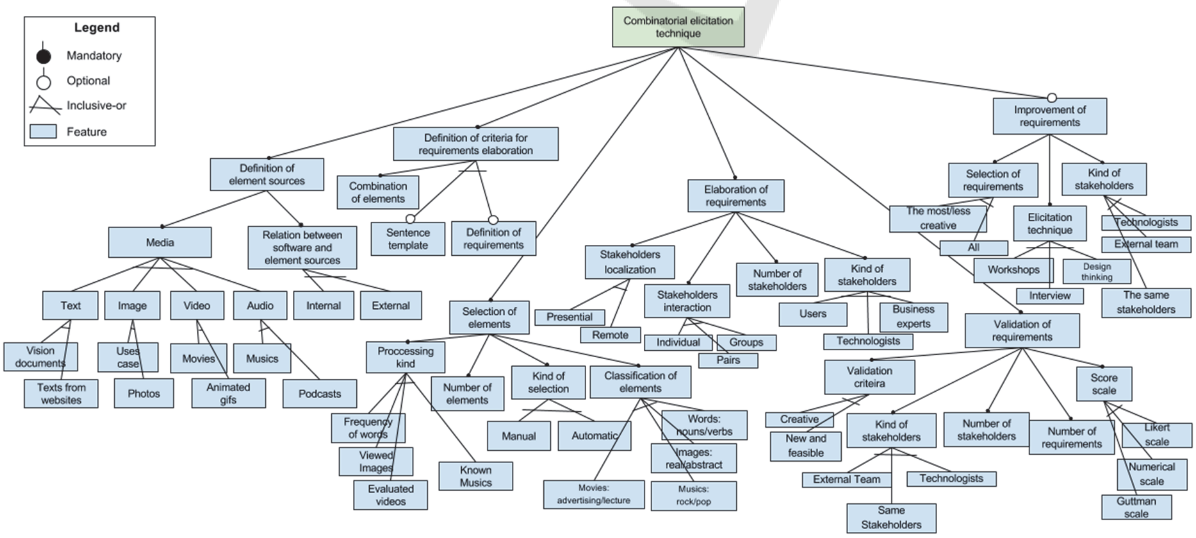

Figure 2: Feature model for our elicitation process.

lectures; for audio: news, advertising, music). This classification influences the definition of the criteria (possible combinations) for the creation of requirements. For example, in (Bhowmik et al., 2014), given textual elements, the participants had to use predetermined pairs of verb and noun;

(ii) kind of processing of element sources, if searching for the most (or least) common elements, for the most (or least) relevant elements or for unfamiliar combinations (for textual elements). This processing form depends on the media used in the sources. For example, if the REng has chosen an image or video social network as element source, it could select images and videos that are better (or worst) evaluated or that are most (or least) viewed. Choosing the *most* common elements results in those most relevant, but that can have already been exhaustively approached. On the other hand, selecting the least common elements can result in those that were not dealt with, but whose relevance for the scope is small.

(iii) element selection form, which can be manual or automated. The manual selection can be used in situations when the number of element sources is not big or when they are not digital (that is, they are, for example, printed text or printed photos); and

(iv) the number of elements to be extracted (and later made available), considering that the greater the number of elements, the easier it will be for the stakeholder to generate a requirement that he or she was already predisposed to request (taking into consideration a need empirically identified). Thus, there will be no effort to create something that was not yet thought of. On the other hand, setting a very small number may excessively limit the possibilities, making it hard to come up with new requirements or even making the creation task an arduous and tedious job.

Definition of criteria for requirements elaboration – This feature indicates the need to define criteria to drive the creation of requirements. These criteria should take into account the classification of the elements, how they should be combined and what is waited to be produced by the stakeholders. For example, in (Pinto et al., 2015): i) each participant must create simple sentences representing a new feature for the system; ii) each sentence must contain at least one word from the list of verbs and one word from the list of nouns; iii) the requirements should be created in a time span of 30 minutes. These criteria can also include a template for the requirements sentences, for instance: "The <system> must/should/will + <verb> + <noun>". Requirements templates provide a simple and understandable approach that helps to reduce the language variation in requirements documents, decreasing the ambiguity and so increasing their quality (Pohl and Rupp, 2011).

Elaboration of new requirements – This feature refers to the elicitation itself, which should be guided by the elements and criteria provided previously and should also consider: (i) stakeholders location - whether they will be present in a face-to-face or remote meeting or if questionnaires will be used; (ii) stakeholders profile - whether they are end users, domain experts or developers; (iii) organization and interaction between stakeholders - if they will perform the task individually, in pairs or in larger groups; and (iv) the number of stakeholders, since it can interfere directly in the amount of generated requirements or in the time it will take to create the desired amount of requirements.

These factors are essential for any elicitation technique. The success (or failure) of an elicitation process is substantially influenced for the availability of resources and characteristics of the project, organization, and environment (Zowghi and Coulin, 2005). It is not always possible to group all the best characteristics due to context and organizational constraints, such as, relevant people are not available, people are geographically spread, people do not work well in groups or not understand each other.

Validation of requirements – This feature includes: (i) the criteria to be used in the evaluation – whether utility, innovation, viability or simply the fact that it was not thought of previously. It is important to make the meaning of each criterion clear since they can vary in accordance with the context or people that are validating; (ii) the score scale to be assign to each criterion, for example, the Likert scale (Matell and Jacoby, 1971), VAS (Visual Analogue Scales), numerical scale or the Guttman scale; (iii) who will perform the evaluation – whether the same group that elaborated the requirements (assuming that they will not evaluate their own requirements), an external team that had no part in the previous task, a team of developers or the REng; (iv) the number of requirements that will be evaluated by each participant and the number of evaluations waited for each requirement. It is necessary to balance these numbers because a large number of requirements for each stakeholder may make the evaluation process boring and thus compromise its quality. At the same time, a little number of evaluations by requirement will make the biased evaluation.

Improvement of requirements – This feature is optional, but once it is selected, the following items should be defined: (i) which requirements will be discussed, for instance, all of them, the most creative or those considered not creative; (ii) which elicitation technique should be used, e.g. interview, workshops or even creativity techniques; and (iii) who are the participants - stakeholders that took part in previous tasks, other stakeholders or only software engineers.

3.3 How to Use this Process Line

In order to use this SPrL, it is necessary to generate a process configuration. Each configuration includes all mandatory features and those optional, or-inclusive or or-exclusive that have been selected by REng. During the selection, dependencies between features must be respected, for instance, when the chosen media is image, it is not possible select a kind of classification associated to text (e.g. verb and object). Configurations may be manually generated by regarding the options and constraints of feature model. When the features are chosen, they must be applied to the activity flow. We illustrate with an example to follow.

Table 1 summarizes a set of possible choices for all mandatory features, in which the last column represents a configuration. In this example, the elements sources are internal and external pictures; the ten most viewed images will be automatically selected and classified according to two people´s feeling (sadness or happiness); being five pictures of each category. The requirements definition rules impose that the ideas have to mention characteristics from at least one picture of each category. Elaboration will be performed by five pairs of users, geographically distributed. The validation will be performed by an external team with three experts in innovation; each person will evaluate all requirements in accordance to Linkert scale with 5 points. Ideas that have the maximum score will be improved and prototyped in a design thinking meeting.

Table 1: An instance of our SPrL - features.

	Feature from SPrL	Instance
Def. of element sources	Internal or external source	Internal and external source: pictures from a social network about the system and a related system
	Media	Image
Selec. of elements	Image classification	Happiness and sadness
	Selection type: automatic or manual	Automatic by using an app for classification
	Processing type	The most viewed pictures
	Quantity of elements	Five of each classification
Def. of criteria for req. elab.	Criteria	Each requirement should be based on a picture of each classification. The participants should cite which pictures he or she has used.
	Requirements definition	A non-structured text explaining a user story
Elab. of req.	Location of the participants	Remote
	Participants organization and interaction	Each pair works using collaborative tools
	Kind of participants	Users who are experts on the domain
	Number of participants	5 pairs
Validation of req.	Validation criteria	New for that system and useful
	Score scale	Likert scale with 5 points
	Kind of participants	Experts on innovation
	Number of participants	3
	Number of requirements each participant validates	All ideas
Improv..of req.	Which requirements	The ideas that have been evaluated with score 5 in all criteria
	Elicitation technique	Design thinking
	Kind of participants	Users and experts that have had part on the elaboration and validation

Figure 3 illustrates how the selected features impact on the activities flow. Basically, inputs, outputs and activities are renamed to directly represent the choices that have been made.

We emphasize that using feature models to map variabilities and commonalities presupposes the possibility of expanding the model in the future, since new features and constraints can come up due to the organizational context of the project that is being developed.

We are developing a tool to support this approach, by assisting the REng in generating configurations, planning the elicitation, managing the requirements elaboration, validation, and improvement.

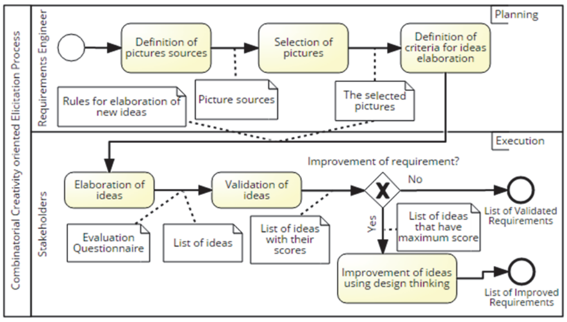

Figure 3: An instance of our SPrL – process.

4 COMPARATIVE ANALYSIS

We validated the SPrL by showing that it is aligned to three combinational creativity-oriented elicitation approaches that were created before this SPrL. Table 2 summarizes this alignment and we highlight the features that were used in each approach.

Firefox and Mylyn Cases (Bhowmik et al., 2014) - In this work, the authors propose a framework for requirements elicitation based on data taken from stakeholders' social interaction. From this data, pairs of words (verbs and nouns), which are not similar among themselves, are extracted. These pairs are then used on generation of new requirements. This framework's validation was performed using an experiment involving two software: Firefox – a web browser; and Mylyn – an Eclipse plug-in to manage software developers' tasks. The sources of information were requirements description and developers' comments, texts that were available in Bugzilla (definition of elements source – textual and internal sources). Social network analysis algorithms were used to extract non-familiar connections between words and stakeholders' comments.

The result obtained was a set of unfamiliar (selection of elements) word pairs (verbs and nouns). After that, a software engineer created new requirements for the two systems. Besides having to use word pairs, he had to follow the subject + verb + noun template, the verb had to act on the noun, and he or she could search the Internet for software features (definition of criteria for requirements elaboration). When the two-hour period was over, the engineer came up with eight requirements for

Table 2: Alignment between SPrL features and related works.

Feature from SPrL		Firefox and Mylin (Bhowmik et al., 2014)	SIGAA (Pinto et al., 2015)	Suap (Pinto, 2016)
Def. of element sources	Internal or external source	Internal source: Requirements and comments from a social net	Internal source: Vision document and use case specifications	Internal source: vision document and use case specifications External source: comments from GooglePlay
	Media	Text		
Selec. of elements	Text classification	Grammatical classification, considering only verbs and nouns		
	Selection type: automatic or manual	Using NLP algorithms	A tool, that also uses NLP	
	Processing type	Pairs of words with low similarity among themselves	Less and most frequent words	Most relevant words and adding manual inclusion and exclusion
	Quantity of elements	Uninformed	30 nouns and 24 verbs	15 nouns and 15 verbs
Def. of criteria for req. elab.	Criteria	To use the pre-defined pairs; the verb must influence the noun	To create one to 3 sentences; to use at least one verb and one noun from each group	
	Template	Subject + verb + noun		
Elab. of req.	Location of the participants	Presential	Remote	Presential
	Participants organization and interaction	Individual		
	Kind of participants	Developers who are experts on the domain	Users	Developers who are experts on the domain
	Number of participants	1	11	3
Validation of req.	Validation criteria	Original and new, relevant and useful	New	Useful and original
	Score scale	Likert scale with 5 points	Valid, invalid, new and common	Likert scale with 5 points
	Kind of participants	Developers who are experts on the software	A SIGAA system analyst	The participants of requirements elaboration
	Number of participants	29	1	3
	Number of requirements each participant validates	All of the requirements		
Imp. of req.	Which requirements	This feature has not been selected		All of the requirements
	Elicitation technique			Interview
	Kind of participants			The participants of requirements elaboration and validation

Firefox and five for the Mylyn (elaboration of requirements). Twenty-nine developers were recruited to validate these requirements, all of them experienced in Java and C (validation of requirements). These participants evaluated the originality and usefulness of each requirement by using a 5-point Likert scale: 1=least innovative, 2=not innovative, 3=neutral, 4=innovative, 5=most innovative.. Six of the eight Firefox requirements and four of the five Mylyn requirements were considered innovative. According to the authors, this result suggests that the framework helps to generate innovative requirements. In this case, activities related to improving requirements were not performed.

SIGAA Case (Pinto et al., 2015) - In this work, the authors propose to simplify the framework above by using a different information source (vision document and use case specifications) and extracting words in a different manner. This technique was validated with an academic management system named SIGAA. From the vision document and use case specifications (definition of element sources - textual and internal sources), 30 nouns and 24 verbs were extracted considering those that showed up the most and the least frequent in the text (selection of elements). After that, 11 users answered a questionnaire that asked them to create one to three requirements using at least one verb and one noun per requirement (definition of criteria for requirements elaboration). This resulted in 25 requirements (elaboration of requirements). A system analyst expert on academic systems evaluated the requirements considering them as: valid requirements - the sentence followed the experiment's rules; invalid - it did not meet the rules; new - valid requirement that had not been implemented; and existing - valid requirement that was already available in the SIGAA (validation of requirements). Therefore, from 20 valid requirements, 11 were considered new. The authors also found that the technique is able to produce creative requirements. The requirements improvement was not included in this experiment.

Suap Case (Pinto, 2016) - This study aimed to use another form of extracting words, as well as consider sources that were not directly related to the software. The validation was carried out through a case study also involving an academic management system named Suap. The element sources used were internal (use case specifications) and external (user comments on two education applications that were available in the GooglePlay Store). These applications were chosen taking into account their scope, the number of downloads and the number of comments made by users (definition of element sources). A support tool called Ideasy was used to process the element sources. In this case, 8 nouns and 8 verbs were extracted from internal sources, while 7 nouns and 7 verbs were extracted from external sources. After analyzing the selected words, the REng replaced 3 verbs and 3 nouns with words that he or she considered important to direct the experiment (selection of elements). Three stakeholders, who were SUAP developers, were present in a face-to-face meeting. After 15 minutes, each of the participants had already created three requirements (elaboration of requirements). The rules for the creation were identical to the rules defined in the previous work (Pinto et al, 2015), with the only difference that the participants could talk about the system's current features but should not share information on what they were writing or what words they were using (definition of criteria for requirements elaboration). These same participants evaluated the requirements created by their colleagues, assigning a score of 1 to 5 considering usefulness and originality criteria (validation of requirements). After that, in an interview conducted by the REng, they discussed each of the requirements and their scores, when they were allowed to detail and expand the ideas that they had defined initially (improvement of requirements), resulting in 5 (out of 9) requirements being considered useful and original.

Discussion

As can be seen in Table 2, all the mandatory characteristics raised by our SPrL are contemplated in the related works. Therefore, these works can be seen as instances or configurations that could have been generated from the SPrL. There are many variations in these three approaches, but they all use exclusively textual element sources and process these sources searching for words classified according to their grammatical function (verbs and nouns). On the other hand, the processing methods used in the approaches are rather different. This is perhaps the feature that most distinguishes them from each other, despite the fact that all of the results were considered satisfactory, generating new requirements for the software.

Our SPrL documents the main variabilities available when using combinational creativity in requirements elicitation. Variabilities that were not used in the reported experiments were also identified to document and suggest possible works using other forms of combination, according to the organizational context. Images, videos and audios elements are examples of these variabilities.

5 CONCLUSIONS

This article proposes a Software Process Line for requirements elicitation based on combinational creativity. The SPrL tasks were defined and documented to help REng to adapt this type of elicitation technique to the organizational context in which the software is being developed. In addition to the activities in the process, we also documented, by using a feature diagram, the common and variable features used when performing each activity.

To evaluate this SPrL, we compared the proposed model to the characteristics of creativity techniques used in experiments found in the literature. This comparison validates the tasks and features modeled in the SPrL since they are also found in the chosen works. Furthermore, this SPrL also specifies features (or the possibility to combine them) that have not yet been used. New variabilities can come up when preparing requirements elicitation techniques that use combinational creativity, however this adaptation could be easier since a set of features was already identified.

Accordingly, we can mention the following contributions of this work: (i) mapping relevant features to be selected by REng, thus making it easy to use this type of technique; (ii) classification and comparison of three combinational creativity approaches that even though seemed different, only vary when it comes to a few specific characteristics. Furthermore, by observing the experimental studies performed, we noticed that the technique's success depends on a set of combined factors that include, for instance, the arrangement of the participants.

Future works include experimental studies to compare the effectiveness of different variations in combinational creativity techniques and comparisons between these and other elicitation techniques. Thus, it is interesting to analyze average (or bordering) values as a suggestion for the number of elements used, the number of stakeholders, the number of evaluators and the number of requirements to be created and analyzed by each evaluator, as well as better score scales. We also suggest an evaluation of the scalability of the use of such techniques with a large number of participants, as well as an analysis if we can define the profile of those participants that were responsible for generating the best ideas. It is also necessary to create or adapt a tool to allow the combination of elements such as images, music and videos, as well as categorization forms according to the type of element used. In addition, we plan to automate the selection of process models via transformation techniques to generate a custom process SPrL through models transformation technique.

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