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De Boeck Supérieur | « Journal of Innovation Economics & Management »

2021/3 n° 36 | pages 33 à 62
ISBN 9782807394575
DOI 10.3917/jie.pr1.0102

Article disponible en ligne à l'adresse :
https://www.cairn.info/revue-journal-of-innovation-economics-2021-3-page-33.htm

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Activating Creativity in Situations of Uncertainty: The Role of Third Spaces

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ABSTRACT
The links between creativity and innovation remain a ‘fuzzy front end’. This study aims to better understand how creativity can lead to innovation in an entrepreneurial context. The literature on entrepreneurial creativity and its links with innovation, enriched by research on the development of an entrepreneurial mindset, is being mobilized. It generates an experiential learning oriented entrepreneurship education program. The goal here is to examine whether third spaces resulting from situations of uncertainty implemented into the curriculum make it possible to activate creativity. The aim is to obtain a useful production adapted to a context, a market. A semi-structured questionnaire is administered via a reflexive essay. Moving from the idea to innovation presupposes that the capacities of the actors are activated into capabilities. The qualitative research provides feedback on the potential activation of the capacities of students as entrepreneurs. The results show that third spaces resulting from situations of uncertainty are places that generate potentially effective conversion factors. They allow the transformation of capacities into capabilities.

KEYWORDS: Creativity and Innovation, Entrepreneurship, Entrepreneurship Education, Situation of Uncertainty, Third Spaces, Capabilities, Conversion Factors

JEL CODES: O310, A230

1. N.B. Both authors contributed equally to this article. They would like to express their warmest thanks to the journal’s three reviewers for their comments and suggestions which have made a great contribution toward the quality of this article.
“There are not just two players in the education game, the traveler and the destination, but there are three, the third place intervenes, here, as a threshold. Now, this portal, neither the pupil nor the initiator knows where this is or what its use is.”


In a turbulent socio-economic environment, marked by deep and rapid changes, creativity, which is often associated with innovation, seems to be an answer to economic problems. So a creative entrepreneurship dedicated to innovation is often put forward as a key element for resolution here. The entrepreneur needs to produce novelty to distinguish themself from the competition and must acquire skills in order to do so. As a vector of accompaniment, Entrepreneurship Education (EE) seeks to promote the spirit of entrepreneurship in students (changing ideas into action to produce value and increase their employability) and to develop the necessary agility to create an organization. Problem-solving skills, risk taking, a sense of responsibility and implementation of coping strategies, are then mobilized (Foliard, Le Pontois, 2017; Le Pontois, Foliard, 2018), as well as creativity and innovation (Gaujard, Verzat, 2011; Capron Puozzo, 2016).

Creativity is the ancestor of innovation and plays an important role throughout the entrepreneurial process (Nyström, 1993; Yuan, Zhou, 2008). The creative skills of individuals are based on certain characteristics such as risk taking, attitude when facing uncertainty or failure, and autonomy and these are also attributes of the entrepreneur (Bissola, Imperatori, 2011). Training students in entrepreneurship therefore implies developing and mobilizing their own skills, both in the entrepreneurial approach and in approaches to creativity and innovation. The ideation process is often at the heart of teaching creativity and innovation in order to stimulate the emergence of ideas about business. Moreover, the models used in EE are increasingly integrating the need for students’ ideas about business to be matched with their potential customers and partners, and for them to do this by entering the ecosystem of a real business (Neck, Greene, 2011). The ‘imperfect’ nature of the information which the students receive within the entrepreneurial experience contributes to what they feel in a situation of uncertainty. Getting ‘outside’, like entrepreneurs, allows them to gather information, to test their business idea, modify it, or even pivot. In fact, highly dynamic environments (unforeseeable and with swift changes) have a stronger influence than stable environments on the links between the positive feelings of the entrepreneur, their creativity, and firm-level innovation (Baron, Tang, 2011). While creativity and innovation are often associated positively (Sarooghi et
al., 2015), the relation between the two has not been made clear, however (Birkinshaw et al., 2011).

Accompanying student teams in their entrepreneurial approach to creation and innovation therefore seems a gamble. We have no studies into the role of uncertainty or, to be more precise, into situations of uncertainty in the activation of creativity and the impact of this on the production of innovation. Does the introduction of situations of uncertainty into an EE model opened to the ecosystem allow the activation of creativity and innovation? To shed light on the black box, which is the passage from creativity to innovation, we are using the construct of the “third space” arising from the paradigm of the third (entity) in education (Fabre et al., 2011). The third space is a space of physical and/or psychological transition, which becomes the third entity for the actors, that is to say, which commits them to a change in attitude and behavior when facing a particular object, which here is creativity and innovation in entrepreneurship.

Our qualitative study investigates the consequences of introducing situations of uncertainty into an educational program for raising awareness about entrepreneurship. Exposure to these situations of uncertainty through activities inscribed in an open and formalized pedagogical framework generates potentially operational third spaces. Their function is to allow students to activate and implement creativity in order to obtain a useful production adapted to a context/market. Besides this, we consider the question of the student's real possibility of acting as an entrepreneur, which is to say of putting their skills into action. The third spaces could constitute so many “space-times”, allowing the emergence of factors of conversion, which would be potentially operational when passing from creativity to innovation. We have based our work on the analysis of learning produced by a pedagogical model which reproduces an entrepreneurial process in the creation phase of an innovative product or service.

The Entrepreneurial Experience: A “Space-time” for the Activation of Creativity

It is impossible at a given moment to have complete knowledge about an environment which has evolved by contingency. This deficit in objective information can be qualified by the term uncertainty (Silberzahn, 2017). The entrepreneur faces two challenges: overcoming the urgency (presence on the
market) and the uncertainty generated by access to ‘imperfect’ information (Knight, 1921; Simon, 1976). The entrepreneur implements a specific action which is translated by their capacity to identify and explore opportunities before others do so (Venkataraman, 1997; Shane, Eckhardt, 2003), all the while innovating by proposing a new product or service, getting into a market, and creating an organization with the resources available to exploit these opportunities (Carsrud, Brännack, 2009). The student acting as an entrepreneur examines the propositions within a team and takes decisions which are intrinsically undecidable (lack of information, trial and error approach, experiential learning). Only the action will be able to prove whether a product or a service will be a success or a failure. Understanding the links between creativity and innovation within the space of entrepreneurial experience supposes identification of the factors that activate creativity in the real business environment.

Creativity and Innovation within the Space of Entrepreneurial Experience: Situations of Uncertainty and ‘Imperfect’ Information in Dynamic Environments as Key Activation Factors

Described as a predecessor and a “fuzzy front end” (Koen et al., 2002) of innovation, creativity is the successful implementation of creative ideas within an organization. It could be defined as the production of new and useful ideas by an individual or a group of individuals working together (Amabile, 1988; Amabile, Pratt, 2016). The identifiable result of this creative process as an economic application is what constitutes innovation and this can be defined as a product or a new or improved process made available to potential users (products) or put into service by the organization (process) (OECD, 2018). Taking an interest in entrepreneurial creativity and in the creative capacity of entrepreneurs means trying to capture the whole of the creative phenomenon. Although the number of research articles on this topic may be few, the interest in this issue is justified by the growing though recent evolution dealing with the subject. Creativity is seen as being a factor of personality which drives people to become entrepreneurs (Zampetakis, 2008; Edwards-Schachter et al., 2015) and is considered as a component of

2. For Knight (1921), the world changes, which implies an “imperfect knowledge of the future” (p. 198). Uncertainty applies to situations in which we cannot know all the information we might need in order to measure them.
3. There are 77 publications on this topic (1990-2015), a number increasing chronologically (Lerch et al., 2015).

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entrepreneurship (Jaillot, 2018), or even as the spirit of entrepreneurship (Tsai, 2014).

New production requires several conditions. First, it depends on a process based on the intrinsic and extrinsic motivations of individuals (Amabile’s original componential model, 1988) but also on environmental influences acting on several levels (the interactionist model, Woodman et al., 1993). For example, collective creativity emerges during a momentaneous collaboration process (Hargadon, Bechky, 2006). Last, the choice of ideas is based on the evaluation on one hand of the level of creativity (number of ideas put forward, originality, desirability – Carrier et al., 2010) and on the other hand on their value potential (Carrier, Gélinas, 2010). Four quality criteria prove to be particularly pertinent for the evaluation and selection of ideas: novelty, feasibility, pertinence and the specificity of the ideas (Simonton, 2013).

Thus, the human agent is the one who has this capacity for transformation, for activation by moving from the idea to the innovation. The literature confirms that creativity as the antecedent of innovation plays an important role throughout all the entrepreneurial process (Nyström, 1993; Yuan, Zhou, 2008). However, theoretical developments have remained scarce (Amabile, Pratt, 2016; Anderson et al., 2014). Some studies have looked at this transformation and identified links between creativity and entrepreneurial intention (Daniel Yar et al., 2008). Creativity, comfort and initiative are positively related with the motivation to become involved in entrepreneurship (Ghasemi et al., 2011). Finally, it also appears that the relation between individual creativity and entrepreneurial intention is wholly moderated by the perception of risks (Daniel Yar et al., 2008) as well as by education and training (Zampetakis et al., 2011).

The passage from creativity to innovation is a complex mechanism. Moderation by variables of influence explains why associations are often indirect, which is to say that there is a third factor explaining the link between two variables and that extrinsic elements participate in this correlation. Among the studies identified by Lerch et al. (2015), Baron and Tang (2011) noted that the positive feelings among founding entrepreneurs are significantly linked to their creativity and that creativity, in turn, is positively related to the firm-level innovation. Thus, they also noted that the two relations are moderated by the environmental dynamics: environments that are highly dynamic, which means where change is swift and unpredictable, have a stronger influence than stable environments. In fact, exposure to raised levels of uncertainty (Dess, Beard, 1984; Miller, 2007) and risk require decision-making on the basis of imperfect information (Knight, 1921; Miller, 2007).
A direct consequence is the generation of high levels of stress which often produces high levels of activation (Stranks, 2005). These results have encouraged us to adopt a crossover approach ‘creativity -uncertainty - third spaces – innovation – entrepreneurship’ basing this on the notion of capabilities.

**The Conversion Factors: From Capacity to Capability**

Being in possession of skills is no guarantee that they will be deployed or actioned. Following Sen (1999) and his notion of capability, in this present research we are questioning the conversion factors which offer freedom of choice in order to act in a constrained context. According to Fernagu Oudet (2012, p. 10), “capability informs the action in a situation. It allows the skills to be activated, to take shape. It is situated in the interval between the means and the results of the action”. Le Boterf (2018) offered a definition of the skill close to capability, based on the principle of duality in quantum physics, in that is understood both as a process and/or a resource; “knowing how to work” is implemented in professional situations which make “professional practices” real. The resources underlying competences and the conversion factors are two pertinent elements for describing the entrepreneur in their capacity to decide and to act. The conversion factors “correspond to all of the factors which facilitate (or hinder) an individual’s capacity to use the resources at their disposal to convert them into concrete realisations. These factors can be individual […], social […] or environmental […]”. (Fernagu Oudet, 2012, p. 10)

The student in entrepreneurship must in fact possess these competences in order to act but also to have freedom of choice for the eventual implementation of their intentions or decisions. Integrating situations of uncertainty into a training program potentially generates third spaces which could foster the emergence of conversion factors that will activate entrepreneurial skills through capability. These spaces are known as transitional (Besson, 2018) because they facilitate the construction of knowledge by a system of externalization - internalization (Nonaka, Takeuchi, 1995). They thus constitute a necessary space for the development of interpersonal relations, the bases of the creation of the different forms of knowledge that are useful in creativity.

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4. An entrepreneur analyses the situation from their sole point of view, objective and subjective (Schmitt, 2009), when selecting the conditions for their action.
Principles for Developing the Spirit of Entrepreneurship and Cognitive Agility in a Team to Serve Creativity

Our model for raising awareness about entrepreneurship is entitled “La farandole creative / The Creative Farandole” and is based on two theoretical frameworks: the principles of educating in promoting the spirit of entrepreneurship (Verzat, 2011) and the pedagogy of cognitive agility (Bornard, Briest-Bréda, 2014). Verzat sets out four principles underpinning education in promoting the spirit of entrepreneurship: learning from real problems by experimenting with innovation projects inscribed in an active teaching program, developing the learners’ sense of responsibility thanks to adapted accompaniment, team learning ‘outside the walls’, benefitting from retroactions on the action carried out thanks to the formative evaluation of the actors both internal and external to the institution. Relying on these principles, Bornard and Briest-Bréda (2014) identified three key points for developing students’ cognitive agility: the need for a non-formalized theme (normative framework with open and clear instructions and method); the development of the individual’s cognitive agility by the group; the creation of “a space-time for agility” (alternating content / reflexive process in a program that is itself agile, created by agile teachers).

Like the entrepreneur generating value by setting up connections with others (Burt, 1995), the students work in teams on an entrepreneurial topic and are on the path of a collaborative approach. Apart from sharing tasks and helping one another they develop their capacities for self-organization, while the teachers are available as resources and stay outside the group’s internal control (Verzat, 2011). In fact, the literature highlights the need to leave learners their autonomy; a team will display more creativity and initiative when the members are granted more freedom and they transform their ideas better into action (Verzat et al., 2016).

Methodology

The initial aim of our empirical study was to observe the consequences of integrating specific situations of uncertainty into a curriculum integrated into the local entrepreneurial ecosystem. We were looking to see whether

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5. This approach goes beyond cooperative learning (sharing and help between learners) defined by Surlemont and Kearney (2009) as one of the pillars for project-based teaching in entrepreneurship. By learning the lessons from the episode experienced as a team at the end of the process, the students should have increased their individual perceived entrepreneurial self-efficacy.
the students were aware of the capacities and capabilities required and implemented during the entrepreneurial experience in order to move from creativity to innovation.

Teaching Model and Terrain: “The Creative Farandole”

The program6 was started in 2019 in the second year of DUT techniques de commercialisation (second year of bachelor in Business and Marketing) exposing teams of students to the real world and its variations in order to create a space for the potentialization of change. The main aim was to develop the spirit of entrepreneurship and the cognitive agility of our students as well as their entrepreneurial skills. Over six weeks they were accompanied in the building of project-based teams inscribed in a central creative process in entrepreneurship (Jaillot, 2016, 2018). The teaching model7 was designed as Problem Based Learning with an experiential approach and was built on a progressive relation to action toward and with the real environment (Frese, Sabini, 1985; Neck, Greene, 2011). Through situations of uncertainty included in it, the teaching model is supposed to generate third spaces8 which favor the students' actions. It gives the students the chance to become aware of their resources and skills as well as their need for skills in order to carry the project through. The open and formalized teaching strategy is structured around the movement i) from capacity to capability and ii) from creativity to innovation thanks to the insertion of situations of uncertainty generating spaces which act as third entities. The aim is to propose a normative context (several deliverables clearly defined and identified, resources platform, time frame) with a clear problem statement and method, with no formalized issue: “a space-time for agility” (Bornard, Briest-Bréda, 2014). Therefore, on the first day we chose not to unveil all the pedagogical model. This creates a first situation of uncertainty. The first phase (see Figure 1) is devoted to creativity and to the process of ideation. Individually, the students propose an idea set in a

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6. This pedagogical program set up on the DUT course (University Technological Diploma, delivered by institutes set up in French universities) is based on the theoretical foundations presented in the preceding section in order to get as close as possible to entrepreneurial reality – the idea of creativity accepted as the creation of knowledge which develops and progresses through an evolutionist and interactionist organizational process. This process is built on an individual conception of creativity at the disposal of a collective which has the intention of producing something new, useful and adapted to a context or a market (Amabile, Pratt, 2016).

7. We created a teaching model according to theories (Kirkpatrick, 1967; Kolb, 1984; Gibbs, 1988) as well as experiential learning models and taxonomies (Bloom, 1956; Biggs, Collis, 1982), linked to the theory of action which is proper to entrepreneurship (Frese, Sabini, 1985). Our model is based on an iterative learning process and on reflexive practice (Le Pontois, Foliard, 2018).

8. Lemaître (2011) proposes four modalities for a pedagogical discourse to produce a third entity: support reflective thinking; create third spaces; insert contradictions between the teaching models within the same program; accept there are gaps between pieces of knowledge.
problem-solving approach and it should satisfy a defined need for an identified end user. The students are divided into teams of six and they evaluate the individual ideas and modify them by proposing new ones (evolutionist approach – Ford, 1996) until one is chosen which, in their opinion has value (Carrier, Gélinas, 2011). A spokesperson for the team presents the project to the whole of the year-group. Each of the students evaluates the projects and reflects on the skills that they could contribute to the projects being examined. A second situation of uncertainty is thus generated by those accompanying them: two persons should remain with their initial project while the others must be recruited in other projects. So, each participant is likely to have to say goodbye to one project and/or team in order to join another project; which, once again, could change according to the creativity generated by the new composition of the team. Here, the secondary objective is to get a form of creativity to emerge that would arise from the interactions between the individuals and the organization (Woodman et al., 1993).

The second phase is devoted to prototyping, “quick and dirty” and “show, don’t tell”, as well as to the user experience. This is the third situation of uncertainty: none of the students has ever experienced this kind of work which, moreover is being self-regulated. The object is to serve as an element for transforming the ideas project into a concrete and identifiable project. Each team devises an artifact (Simon, 1969; Sarasvathy, 2003) to support the presentation of their business idea to the test users. The students have five hours to test their idea outside of the university. This time uncertainty is generated by the presentation of the ideas to actors in the real world who know neither the students nor the project nor the model. The students compare their certainties with the users’ replies, which are potential generators of uncertainty and they may cause a change in direction in their business idea. Next, the teams check out registered patents in order to position their product or their service as innovative (in the various meanings of this term). The third and final phase is given over to the realisation of the GRP business model (Verstraete, Jouison-Laffitte, 2009).

The model, which is divided into 3 explicit phases for the students, is in fact made of 5 phases each of which includes a third space which can be mobilized by the students to allow them to acquire the skills used to realize the entrepreneurial project.
**Figure 1 – Architecture of the model for the generation of conversion factors**

**Phase 1**
- **Situation of uncertainty**
- **Potential conversion factors**
  - Creativity: individual then collective
  - Change of project or of team members
  - Prototyping “quick and dirty”

**Phase 2**
- **Situation of uncertainty**
- **Potential conversion factors**
  - Innovation: produced by the collective

**Phase 3**
- **Situation of uncertainty**
- **Potential conversion factors**
  - Evaluation “out of the building” user response
  - “Out of the building” user response in very limited time

**Phase 4**
- **Situation of uncertainty**
- **Potential conversion factors**
  - Validation of the innovative nature of the product or service developed
  - Final presentation with finalized artefact, business model document including the source patent (INPI)
  - Possible pivot
  - Writing an essay on personal thoughts dealing with the whole of the lived entrepreneurial experience

**Phase 5**
- **Situation of uncertainty**
- **Potential conversion factors**

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**Formative Evaluation 1**
- **Individual ideation on a real problem (free choice)**
  - Presentation to a team of 6
  - The collective chooses the best idea

**Collective ideation (possible change of direction)**
- Creation of a poster (user need, response, value creation)

**Formative Evaluation 2**
- **Ideas and skills market**
  - Two students from the original project present and defend the business idea from the group project
  - Recruitment of four new members by two members of the initial group (migration of four former members towards other teams)
  - 2 students out of 3 change project

**Formative Evaluation 3**
- **Pretotyping by the collective creation of an artifact**
  - Use made of material and immaterial resources, access to FabLab,...

**Summative Evaluation**
- **Valuation of the innovative nature of the product or service developed**
  - Final presentation with finalized artefact, business model document including the source patent (INPI)
  - Possible pivot
  - Writing an essay on personal thoughts dealing with the whole of the lived entrepreneurial experience
# Research Protocol

<table>
<thead>
<tr>
<th>Stages</th>
<th>Content</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Phase 1</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Starting point for the research project</td>
<td>Open discussion by two teacher-researchers in entrepreneurship (different profiles) Participation of a third teacher-researcher (guiding role)</td>
<td>Opportunity of the field study: a new teaching model dedicated to entrepreneurship</td>
</tr>
<tr>
<td>Construction of an entrepreneurship teaching model</td>
<td>Representative model of a real entrepreneurial process</td>
<td>Model in three stages open to the real ecosystem and leading students to propose a business model</td>
</tr>
<tr>
<td>Research protocol</td>
<td>Integration of situations of uncertainty into the model</td>
<td>Choice of the kind of data to gather (reflexive essays, observations in the field) method of analysis) epistemological constructivist positioning, abductive approach (recursive loop –David, 1999)</td>
</tr>
<tr>
<td><strong>Phase 2</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Implementation of the teaching model</td>
<td>Rollout of the module, conforming to the planned phases</td>
<td>Implementation of the planned phases, reception of the deliverables</td>
</tr>
<tr>
<td>First gathering of material</td>
<td>Analysis of field observations (teacher-researchers) Writing a logbook of the entrepreneurial experience (students)</td>
<td>Decision to not hand out at this stage the questionnaire behind the writing of the final reflexive essay</td>
</tr>
<tr>
<td>Phase 2 notes</td>
<td>Exchanges between the teacher-researchers</td>
<td>Observations: - Students aware of the way of working and the fact they do not know the complete development - Validation of the resemblance to the effectual type of entrepreneurial process (Sarasvathy, 2001) Consequence: Modification of the questionnaire behind the writing of the reflexive exercise</td>
</tr>
</tbody>
</table>
### Data Gathering

Retrieving information from the field follows a qualitative approach inspired by grounded theory (Glaser, Strauss, 1967) but in coherence with the more constructivist approach proposed by Strauss and Corbin (1998). To follow Garreau and Bandeira-de-Mello (2010) who deal with the tension between scientificness and creativity, we carried out open coding while maintaining ‘fit and closeness to the data’ (Corbin, Strauss, 1990). This criterion means limiting our creativity by focusing on strong coherence seen between our field observations and the data collected (Jaillot, 2018) thanks to the presence of three teacher-researchers during the teaching experiment. Our abductive approach eased the construction of knowledge which sanctioned the return trips made between the literature and the data analysis.

The terrain under study was made up of 17 project teams – 8 students aged 19 to 20 on an initial training course. Our data gathering was based on accounts of the entrepreneurial experience that they underwent, based on a semi-structured questionnaire given to the students at the end of the module (appendix 1). These reflections in essay form, are on average 677 words long (1 to 2 pages). These essays were originally seen as having a meta-cognitive vocation (a reflexive practice to get the students to ponder their entrepreneurial experience at the end of the module) and are supposed to be sufficiently broad and open, and the students are free to tackle whatever points they wished.
Treatment of the Data

Coding of the situation of uncertainty was carried out starting from key words identified in the students’ writings. We used the CNTRL’s lexical portal. First, a word frequency search in the 54 essays revealed the word déssta-bilisé (unsettled) as the most frequently used among 35,723 words analysed. Different variants of this word were identified in 28 references and therefore represented the most frequent entry for our primary coding. The term appears in the questionnaire put to the students.

Table 2 – Proxemics of the term désstabiliisé (unsettled) (CNRTL, 2019)

<table>
<thead>
<tr>
<th>Direct proxemics, synonymy</th>
<th>Associated forms or roots</th>
<th>Number of occurrences in the 54 reflexive essays</th>
</tr>
</thead>
<tbody>
<tr>
<td>Déstabilisé (unsettled)</td>
<td>Déstabiliser (to unsettle)</td>
<td>Unstable, instability, destabilization</td>
</tr>
<tr>
<td></td>
<td>Perturber (to disturb)</td>
<td>Perturbation, disruptive</td>
</tr>
<tr>
<td></td>
<td>Troubler (to trouble)</td>
<td>Trouble</td>
</tr>
<tr>
<td></td>
<td>Déranger (to bother)</td>
<td>Disturbance</td>
</tr>
<tr>
<td></td>
<td>Désorienter (to disorient)</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Déséquilibrer (to unbalance)</td>
<td>Imbalance</td>
</tr>
<tr>
<td></td>
<td>Mettre mal à l‘aise</td>
<td>Have difficulty in ...</td>
</tr>
<tr>
<td></td>
<td>Ébranler (to shake)</td>
<td>-</td>
</tr>
</tbody>
</table>

Finally, a search for the proxemics of the associated noun instabilité (instability) directed us toward two words that are pertinent to our study: changement (change) and incertitude (uncertainty) (Table 2). The notion of uncertainty, the topic of this research, expresses the unknown and creates a feeling of apprehension in the individual, which changes into a feeling of anxiety and there is a stress reaction. The instability described should be able to help us understand what the student has perceived, what feelings arose from this and what the end result was once the activity was over. Primary coding helps to identify these terms as well as their close forms and associations (Miles, Huberman, 2003). From this lexical analysis, the coding was done to identify i) what the students spoke about, and ii) how they spoke about it (Table 3):

9. The Centre National de Ressources Textuelles et Lexicales (CNRTL) brings together computerized language resources and language processing tools (CNRS – French National Centre for Scientific Research).
Table 3 - Coding procedure

<table>
<thead>
<tr>
<th>Primary Coding</th>
<th>Secondary Coding</th>
<th>Final Coding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Qualification of the students’ perceptions and feelings</td>
<td>Attribution of common meaning and regrouping by differentiation and similarity</td>
<td>Categorization of groups and identification of the meaning</td>
</tr>
<tr>
<td>What the students spoke about</td>
<td></td>
<td></td>
</tr>
<tr>
<td>How the students spoke about it</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This *a posteriori* coding consisted in giving meaning to the references arising from the students' essays (example Appendix 2). Meaning is attributed by the coder in line with the object of our study. The coding was then continued on a second level in order to identify the situations of uncertainty perceived by the students as well as the associated consequences. The last step in the coding consisted in making a matrix for the comparison of units of meaning to identify which situation of uncertainty could be attributed to which consequence and then to categorize them. The coding procedure consisted in creating categories by searching for similarities and differences. The aim was to reveal homogenous themes classed in the text corpus. In order to analyze these data we used NVivo software.

Results: An Experiential Space for Potentializing the Activation of Creativity in Innovation

The results displayed are based on the analysis of the students' reflexive essays matched with the observations made by the three teachers who participated in the trial. The cross tabulations among the affected units of meaning (*what the students spoke about* crossed with *how the students spoke about it*) show which situation of uncertainty is the antecedent of which consequence and they lead to the proposal of categories obtained by similitude and differentiation (comparison matrices with affected units of meaning). The students were capable of identifying the situations of uncertainty. They named the different objects concerned in the situation as well as the consequences, which were most often positive.
The Students Feel They Are Faced With Situations of Uncertainty Generated in Our Model

In all, there were 81 references including students’ perception of uncertainty which were identified in the 42 essays among the 54 analyzable cases. There were 12 students who handed in their essays without expressing any uncertainty.

Among these 81 references, in 24 essays we identified 35 references which contained a direct consequence associated with student perception of uncertainty:

Ref 40/1 “It’s true that changing group unsettled us a little at the start because we had got involved in the project.”

Students facing uncertainty mobilized the third space to continue and to progress through the phases of the model. The student made choices according to the situation in which they found themselves. For example, the fact of having to change group allowed the student to change project and not necessarily let the other members that they were going to work with have priority in making choices. The third space thus mobilized by the student following a situation of uncertainty which became a factor of conversion to pass from one phase of the project to the next.

Ref 37/3 “Regarding the recomposition of the teams, I found this rather disconcerting but, in the end, it was interesting because that allowed people who were not comfortable in their first project to find one where they felt more at ease.”

The results show that the students did not all feel the same thing when faced with the uncertainty programmed into the model (identified using different terms: unsettled, fear, stress) and they showed a gradation in the uncertainty perceived. Some even said they were not perturbed or else they saw the uncertainty as a vector of autonomy. Moreover, they did not all perceive the uncertainty at the same time and concerning the same objects (Table 4). Some related how they were unsettled by changing group while for others the object of uncertainty was found in the meeting with the users spoken to outside the university or even by the fact that they found themselves alone when it came to finding ideas at the beginning of the model.
Table 4 – Situations of uncertainty perceived and expressed by the students

<table>
<thead>
<tr>
<th>Situations of uncertainty perceived and expressed by the students</th>
<th>Number of references</th>
</tr>
</thead>
<tbody>
<tr>
<td>Changing group</td>
<td>22</td>
</tr>
<tr>
<td>Pedagogical novelty</td>
<td>21</td>
</tr>
<tr>
<td>Change of project or abandon</td>
<td>15</td>
</tr>
<tr>
<td>Creative incapacity</td>
<td>10</td>
</tr>
<tr>
<td>Respect for deadlines, time management</td>
<td>6</td>
</tr>
<tr>
<td>Meeting users</td>
<td>3</td>
</tr>
<tr>
<td>Writing the business model document</td>
<td>3</td>
</tr>
<tr>
<td>Source patent, existing product</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td><strong>81</strong></td>
</tr>
</tbody>
</table>

Consequences Segmented According to the Object with a Valence That Is Basically Positive

Negative or positive, the students characterized the results arising from the conversion factors, which we called consequences.

Ref 43/1 “At that point I was very happy because in my previous group I didn’t like the product chosen at all. But the new project delighted me and I was much more motivated.”

Among these 81 references, 50 expressed a positive consequence directly linked to the uncertainty caused by the entrepreneurial model – that is to say, an object is directly associated with a consequence by the student. Only 9 references had a negative sense (coming from the essays of 7 students). The negative consequences lie mainly on the fact of having been obliged to abandon a project which the student had initiated (6 out of the 9).

The references were then categorized according to the object and the consequence expressed (Table 5). Three main categories appear: i) the consequences linked to the project and to its realization, ii) the consequences linked to the individual, to relations between the students in the project (affect and motivation), iii) the consequences linked to the group dynamic and to shared skills:
The first category is oriented “project” and action (progress of the project, pivotal moments, realization, …). The experiential nature of the model, anchored in a real ecosystem, induced autonomous action among the students and not a result to be reached. This action in this generated the transition from capacity to capability. The second category relates to the constitutive elements of the operating individual (personal skills mobilized and/or developed, motivations, emotions). The students were out of their comfort zone and surprised themselves at their capacity to mobilize resources in order to act. The third category had to do with the group (group dynamic, sharing and relaying of skills induced by the model). The complementarity of knowledge and skills (more generally, resources) between students in the same team improved their perception of the feasibility of the project and incited them to action.

The results of our analysis associated with the successful progression made by the students between idea and innovation shows that they knew how to mobilize their skills into action thanks to the freedom of choice implemented by the model. The student could decide and act by relying on one hand on individual resources underpinning the skills and made available to the group and on the other hand on conversion factors mobilizable thanks to the third space. The action submitted to uncertainty allowed capacities to be changed into capabilities, which is what we notice with the artifacts of the innovative products proposed and the associated business models. In tables 6 and 7, a conversion factor appears as the row-column intersection. For example, 5 references have to do with the change of group being seen as beneficial for the project (Table 6); the students were able to act and develop capabilities for the project thanks to changing groups, the third space corresponding to this situation of uncertainty being composed of the new team.

Certain students themselves expressed their understanding of this link between the situations of uncertainty generated and the conversion of their capacities into capabilities.
<table>
<thead>
<tr>
<th>Uncertainties</th>
<th>Factors</th>
<th>Spaces perceived positively by the student</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Project: realisation, progress of the project</td>
<td></td>
</tr>
<tr>
<td>Change of group</td>
<td>5 references: 01;08;14;41;46</td>
<td></td>
</tr>
<tr>
<td>Pedagogical innovation</td>
<td>3 references: 15;29;45</td>
<td>1 reference: 14</td>
</tr>
<tr>
<td>Changing, abandoning the project</td>
<td>2 references: 29;43</td>
<td>3 references: 15;24;29</td>
</tr>
<tr>
<td>Creative inability</td>
<td>2 references: 30;51</td>
<td>3 references: 2;11;49</td>
</tr>
<tr>
<td>Deadlines to respect, workload</td>
<td>1 reference: 52</td>
<td>2 references: 27;36</td>
</tr>
<tr>
<td>Facing external users</td>
<td>5 references: 01;08;14;41;46</td>
<td>1 reference: 17</td>
</tr>
<tr>
<td>Drawing up the business model</td>
<td>0 references</td>
<td>1 reference: 25</td>
</tr>
<tr>
<td>Analysis of patent source, already</td>
<td>2 references: 47;55</td>
<td>3 references: 15;24;29</td>
</tr>
<tr>
<td></td>
<td>20 references</td>
<td>1 reference: 17</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Individual: personal skills, motivations, emotions</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 reference: 14</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Group: group dynamics, skill sharing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 reference: 3</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total positive references</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>9</td>
<td></td>
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<tr>
<td></td>
<td>6</td>
<td></td>
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<td>7</td>
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<td>7</td>
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<td></td>
<td>7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>14</td>
<td></td>
</tr>
</tbody>
</table>
### Table 7 - Conversion factors according to the object and the situation of uncertainty: negative consequences

<table>
<thead>
<tr>
<th>Uncertainties</th>
<th>Factors Regret at having abandoned the original project</th>
<th>Other negative consequences</th>
<th>Total negative references</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change of group</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Pedagogical innovation</td>
<td>0</td>
<td>1 reference: 52</td>
<td>1</td>
</tr>
<tr>
<td>Changing, abandoning the project</td>
<td>6 references: 03;08;17;38;46;51</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Creative inability</td>
<td>0</td>
<td>1 reference: 10</td>
<td>1</td>
</tr>
<tr>
<td>Deadlines to respect, workload</td>
<td>0</td>
<td>1 reference: 33</td>
<td>1</td>
</tr>
<tr>
<td>Facing users</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Drawing up the business model document</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Analysis of patent source, already existing product</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Total:
- Spaces perceived negatively by the student: 6 references
- Other negative consequences: 3 references
- Total negative references: 9
“On this training course we’re not used to having to produce something without any real instructions. Nonetheless, this has helped to widen our horizons and to find our own guiding lines for the project.”

**Consequences Affecting the Realization of the Project**

To generate an innovation, a project takes shape and is finalized thanks to a dual movement: the accomplishment of a process in stages associated with the interaction of individuals and their environment and the group. It imposes an iterative approach on the students who make return trips between their creativity, personal and then collective, and the finalized proposition of the innovation produced. According to the students, the situation of uncertainty that was generated played its part in the success of the projects and this is confirmed by the evaluation of the deliverables.

Two situations of uncertainty were most often the sources of conversion factors for the realization of the project: switching group and facing external users. The third space has often allowed a re-conception of the offer proposed, the project turning more toward another user response or another way of designing it.

Ref 08/2 “However, after the exercise where users questioned in the street were faced with our products, we decided to take a new direction with our project. I went through a period of being unsettled at that point because I no longer knew how to conduct the project but after a short period of reflection we took the feedback into account.”

**Consequences Linked to the Student’s Relation to the Project**

The 16 references that we collected show that each situation could give rise to consequences for the way that the individual functioned: feelings linked to emotions or raised awareness about the activity. These are the traces left by the changing of capacities into capabilities and they represent the expression of different combinations in functioning that an individual is free to set in motion. The consequences that are expressed indicate that the student was affected personally and they may have motivated them into carrying out the project.

Ref 06/1 “When we went to question the people in the street we felt like a feeling of pride because the people were really interested […].”
Consequences Linked to the Group Dynamic and to the Shared Skills

The students identified the collective interest and the shared skills, in particular when the project constituted a sort of common good submitted for evaluation. The results revealed unsettling situations of uncertainty which the students mobilized collectively in order to progress. The team effort allowed the building of new knowledge by externalizing elements of the project, for example when it was submitted to the reaction of the external user or that of other members of the group. Once all the types of knowledge had been assembled this gave rise to the production of several creative possibilities to be discussed, evaluated and then selected (evolutionist approach to the selection of projects) according to the criteria favored by the students. They were free to choose and the uncertainty caused by the changes in team partners or by meeting the outside world caused the projects to evolve or even to change course completely.

Ref 41/2 “The consumers showed great interest in a system which would allow them to get the potato chips out of the bag without having to plunge into it, but the idea of using a spring seemed to them to be complicated and quite hard to achieve because of the complexity in producing and designing a spring which would work correctly. This experience unsettled me somewhat but after a quick think we took these comments into account and unanimously we decided to focus on the design of a rotating system which would bring the chips up, that the consumers could operate themselves according to the quantity of chips consumed.”

Our results show the importance of inserting situations of uncertainty into the core of an EE model in higher education. The analysis helped us to identify on one hand whether or not the students had seen the uncertainty created in the heart of this entrepreneurial model, and on the other hand what they expressed as consequences of the uncertainty that they perceived, if it was perceived. Considering the EE as an artifact (Simon, 1969; Sarasvathy, 2003), we imagine it as an artificial space in which the educational influence can come from a third element, physical or symbolic. Following Sen (1999), we distinguish between the skills of the student entrepreneur based on their capacities as being their own resources and their capabilities which are their real possibilities for action. Two elements are thus needed for action: resources, as the foundation of capacities and skills, as well as the factors of conversion as facilitators of the action (Fernagu Oudet, 2012). According to the students, the curriculum includes different situations of uncertainty which could play the third part and mobilize the conversion factors: the change of group and/or the change of project, pedagogical novelty, meeting
the external users, drawing up the business model (including the proposition of value), innovation. Our initial aim had been to observe how the students as entrepreneurs could have mobilized the situations of uncertainty to activate creativity in innovation. We note that the mobilization of third spaces constitutes factors for the conversion of capacities into capabilities.

**Discussion**

Building situations of uncertainty into an EE teaching model leads the students to construct the right conditions themselves for the realization of their entrepreneurial project. Our results concur, in part, with the studies made of the third space (Fabre et al., 2011), on teaching entrepreneurship (Verzat, 2011, 2012) and more particularly on the pedagogy of cognitive agility (Bornard, Briest-Brédé, 2014). There are two clusters of elements that can constitute a third space (Fabre et al., 2011, p. 10) for our students: i) expression inscribed in a situation which gives meaning to a theme of which the student is unaware and which gives “a feeling of coherence that is not just intellectual but also – and above all – existential”; ii) a “pedagogical framework” which allows the participants to think for themselves, moving away from media and academic dogma. Thus it is about linking affect and intellect. The creativity exercise might in itself be unsettling, and the fact that students were able to follow through a creativity approach shows that the conversion factors based on third spaces arising from uncertainty are relevant in a teaching program of this kind. The student who is frightened by the seemingly huge task to be accomplished (the size being perceived in the absence of a predetermined framework and an expected result) plus the risk of failure (because they do not feel “creative”), or who is scared of finishing up with a production that in the end is useless and not adapted, manages nevertheless to find ideas within these third spaces that are collective and/or individual. In effect, these spaces have been designed as being collaborative and the other actors (teachers, informal actors interested in the project) are simply present to allow an interaction that is potential but not imposed nor supervised, since the student team is self-governing. The student interacting with the members of the team co-builds according to their own resources and those of the members of the group or in their environment, by implementing an individual cognitive agility within the group. Nevertheless, these third spaces are not constraining in the sense that the students design their own activity at will. They appropriate and mobilize the third space with their own tools, filters and ways of seeing the world and themselves create, within the team, the conversion factors needed to progress along the path of creativity that they need in order to
activate the innovation. The absence of any formalization of the theme and the immersion into a complex situation cause the students to ask themselves questions about the route they are taking and not just about the result, which validates the works of Bornard and Briest-Bréda (2014).

It is interesting to identify the few negative consequence perceived by the end of the curriculum, the field of our empirical study. If a situation of uncertainty was able at first to generate a negative consequence for a student, we observed a positive conversion of this consequence by the end of the course for nearly all of the students (three students did not operate this conversion). So, we observed in the students a result comparable to that of the study by Baron and Tang (2011) underlining the positive impact of highly dynamic environments on the links between the entrepreneur’s positive affects, their creativity and the level of innovation in the enterprise. We are making a complementary contribution; the positive impact on the student team of the worth of individual affects, perceived in the consequences that were expressed (positive, in the large majority or converting the negative into positive). For example, changing group may have been felt negatively. This situation is re-evaluated in regard to the new team and its productions – more efficient and pleasant to work with people that one did not know, more commitment in working on a really motivating project. Concerning the passage towards creativity, to innovation in entrepreneurship, the authors of an interactionist approach identify the importance of relationships with the other actors and elements of the environment, but they do not however integrate the situations of uncertainty as the source for the creation of a third space mobilizable by an entrepreneur. Now, these are in fact, creativity spaces as soon as the entrepreneur is the decision-maker in the situation. Our work suggests an immediate application through the raised awareness of the environment in which the entrepreneur is moving. What they pay attention to, how they integrate what surrounds them, their intentions regarding current or future projects, all participate in the construction of spaces which can be third spaces that will generate factors of conversion. The actor thus builds a space for problematization as noted by Schmitt (2006) and the uncertainty of the entrepreneurial situation allows them to tackle the amount of opening of the creativity space. Facilitating, accepting or building these situations of uncertainty allows the chance to place the cursor of formalization. On one hand, we could have a very formalized process, not very open to problematizing and thus poor in third spaces that could be mobilized to generate conversion factors. On the other hand, it might be a reduced formalization favorable to the problematization and a generator of conversion factors. If the mobilizable third spaces are numerous, the actor can take advantage of the conditions in the situation to engage their action, in a “space-time of agility”
(Bornard, Briest-Bréda, 2014). What happens then at that moment is private and is not a phenomenon that the individual necessarily controls. It is a relationship between the individual and their environment which will feed this phenomenon and allow the creation of new knowledge. The fact that the context is shared and that it leads to the building of new meanings is in tune with our approach to the third space. The creation of knowledge is not just individual and subjective, it is above all an emergence of shared contexts, in action. It depends on the interactions and is designated as a co-transcendence (Nonaka et al., 2008). The third space is then the door key to the entrepreneur’s self-expression (or that of the student, as in our model) who permits himself to explore their own potentialities offered in each situation.

And yet, several limits appear in this empirical research. Out of 85 reflexive essays, only 54 are analyzable. It has not been possible to reconstitute the individual path of each student (before and after changing teams). Moreover, this present research is by nature case-based and only concerns one cohort.

**Conclusion**

The emergence of creativity and the passage toward creativity in innovation remain complex objects of research to be examined with modesty. A route opens up to apprehend the phenomenon of the transformation of creativity into innovation via the conversion factors arising from situations of uncertainty, notably thanks to an approach using emotions and feelings. In a second phase of the research involving a new cohort we would like to analyze the data by coding the affects expressed in the reflexive essays as well as coping strategies (or adjustment when facing stress) that are implemented in order to then link them to the situations of uncertainty that are proposed in order to see their role in the emergence of the conversion factors and their impact on the creativity/innovation process. This work, which by nature is empirical, may have theoretical prolongations with some thinking to be done about the notions of an enabler space that is transferable to other fields. Included in these spaces are the actors who participate indirectly in the forming of skills for action, such as the teacher-researchers who modify the relation to action in the very framework of an agile teaching model (Bornard, Briest-Bréda, 2014). For that, the boundaries have to be pushed back. The notion of uncertainty itself must be redefined in a framework linked to entrepreneurial creativity. Silberzahn (2019) suggests two options for facing up to entrepreneurial creativity: i) identify "the futures to be avoided" and firming up one’s capacity for resistance when facing difficulties, ii) adopt an entrepreneurial approach. This second option "consists in saying that it’s not worth predicting the
future if one helps to create it. In that case prediction is replaced by control, which is what all great innovators do who ask themselves what they personally want as a future. For them, therefore, uncertainty is above all an opportunity which allows them to modify the environment, while leaving to the system the chance to renew itself” (p. 13). Beyond ‘facing up to’ and seizing the possibilities in a situation of uncertainty, we propose to facilitate the appearance of these opportunities by identifying, accepting and then consciously building these spaces (arising from uncertainty) integrated into an entrepreneurial approach.

REFERENCES


GAUJARD, C., VERZAT, C. (2011), Former à la créativité... un pari insensé?, Entreprendre & Innover, 3, 137-146.


JAILLOT, M. (2016), De l’importance de la créativité entrepreneuriale. Le cas des petites entreprises, Technologie et innovation, 16(1).


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**Appendix 1 – Reflexive essay (semi-structured questionnaire)**

“The Creative Farandole”

Based on the following questions, I will write a text reflecting on my entrepreneurial experience in a team.

I am free to follow the questions or to gain inspiration from them in order to answer them. In the document, I will give details about which day I wrote which passage.

1/ I identify and describe all the key events in my entrepreneurial experience in a team.

I specify the emotions I felt at each stage and try to explain why I had these feelings.

2/ I describe all the modifications made to the project. I explain why these changes were made and say whether or not I agreed with these changes.

3/ I detail the skills I made available to my team. I include the skills I developed thanks to this project. To do this I use the skills references EntreComp2024 (page 8).

If I mobilised resource people from my personal network, I explain this. If I mobilised people I didn’t know but who were a resource for this project, I explain this.

4/ I position myself on my perception of the development of my entrepreneurial spirit (0 = it’s not me at all, 10 = it’s totally me)

Did this perception evolve as the project progressed?
Appendix 2 - Coding approach based on the students' reflexive essays

I accept risk taking (project in the ecosystem) 0 1 2 3 4 5 6 7 8 9 10
I take initiatives 0 1 2 3 4 5 6 7 8 9 10
I know how to take decisions or share in them 0 1 2 3 4 5 6 7 8 9 10
I know how to mobilize my network and develop it 0 1 2 3 4 5 6 7 8 9 10
A market innovation Y/N, a product/service innovation Y/N
Modified user behavior Y/N, modified social behavior Y/N

5/ I think our innovation (I can check several boxes) constitutes:
- a market innovation
- a product/service innovation
- modified user behavior
- modified social behavior

6/ I describe the phases that I preferred in this entrepreneurial project and explain why I liked them.

I describe the phases that unsettled me, even a little, and I explain why they unsettled me.

Free comments and suggestions relating to my experience.