Mind mapping to facilitate Business **Model learning and spark** learners' creativity

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La carte mentale pour favoriser l'apprentissage du *Business Model* et susciter la créativité des apprenants

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Résumé

Le Business Model est devenu un objet d'étude consacré par des publications dans les revues scientifiaues. Cette expression et la objet d'étude consacré par des publications dans les revues scientifiques. Cette expression est apparue dans un contexte entrepreneurial où les porteurs de projet devaient être particulièrement actué devaient être particulièrement créatifs pour imaginer des façons de faire des affaires dans un univers nouveau (Internet) Les chartes de la Rusiness nouveau (Internet). Les chercheurs tendent toutefois à oublier cette dimension créative du Business Model. Lorsou'elle est évocuée la Business Model. Lorsqu'elle est évoquée, le propos est anecdotique et les recherches empiriques liant Business Model et créativité en contexte attenueuriel continue d'une que la Businese Model devient un Model, Lorsqu'elle est évoquée, le propos est anecdotique et les recherches empiriques tiant busiliess Model et créativité en contexte entrepreneurial sont rares. Alors que le Business Model devient un outil à enseioner pour sider la contexte entrepreneurial sont rares. outil à enseigner pour aider les porteurs de projet à mettre au point leur affaire, il semble raisonnable d'inaginer des formes d'apprenties au sité autor de des sectors sectors de leur affaire, il semble raisonnable d'imaginer des formes d'apprentissage intégrant la dimension créative du Business Model. Autrement d'in a s'aoit pas couloment de forme reported à la province Model d'integrant la dimension créative du Business Model. Autrement a imaginer aes formes d'apprentissage intégrant la dimension créative du Business Model. Automena dit, il ne s'agit pas seulement de faire apprendre le Business Model, il convient également que les apprenants (étudiante portaine de preist automente de préstimité lorsau'ils apprenants (étudiants, porteurs de parjet, entreprendre le Business Model, il convient egalement que cos apprenants (étudiants, porteurs de projet, entrepreneurs, etc.) fassent preuve de créativité lorsqu'ils l'utilisent. Les autours de cost article action tout de la cost article faite faite faite faite faite faite faite apprenants (etudiants, porteurs de projet, entrepreneurs, etc.) fassent preuve de creativite iorsqu us l'utilisent. Les auteurs de cet article ont mobilisé, à cet effet, la carte mentale pour à la fois favoriser

Mind mapping to facilitate *Business Model* learning and spark learners' creativity

Abstract

The Business Model has become an object of study consecrated by publications in scientific journals. This expression appeared in a context where entrepreneurs had to be particularly creative to imagine new ways of doing business in the unexplored environment of the Internet. Yet, researchers too often forget the creative dimension of the Business Model, and empirical researches linking the Business Model to creativity are scarce. As the Business Model has become a tool that is taught to help entrepreneurs fine-tune their businesses, it seemed useful to imagine teaching methods that integrated the creative dimension of Business Model. In other words, it is no longer enough simply to teach the Business Model, it is also appropriate for those learning it (students, entrepreneurs, business people etc.) to show creativity when using it. In this article, we mobilized mind maps both to facilitate learning about the Business Model through the GRP Model (Generation and Remuneration of value, Partnership) and to stimulate its inherent creativity. A pedagogical action-research was set up, whereby learners (students in entrepreneurship) manipulated different tools to conceive a complete Business Model from a simple idea. The results show the reflexivity between the Business Model and creativity, because the Business Model is a source of creativity for learners, while creativity through mind mapping stimulates the conception of new Business Models. These results offer new horizons for teachers by concretely illustrating a concept that is much discussed

while all too often lacking the visual production of Business Models.

Keywords

Business Model, Creativity, Mind mapping, GRP Model, Research action, Entrepreneurship education.



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El mapa mental para favorecer el aprendizaje del *Business Model* y suscitar la creatividad de los estudiantes

Resumen

La expresión Business Model (BM) apareció en un contexto empresarial donde los portadores de proyecto debían ser especialmente creativos para imaginar maneras de hacer asuntos en un nuevo universo (internet). Los investigadores tienden no obstante a olvidar esta dimensión creativa del BM. Mientras que el BM se convierte en una herramienta que debe ensenarse para ayudar a los portadores de proyecto a poner a punto su asunto, parece razonable imaginar formas de aprendizaje que integren la dimensión creativa del BM. Es decir, no se trata solamente de enseñar el BM, sino que conviene también que los que aprenden (estudiantes, portadores de proyecto, contratistas, etc.) demuestren creatividad cuando lo utilizan. Los autores de este artículo movilizaron a tal efecto, el mapa mental para favorecer a la vez el aprendizaje del BM según el modelo GRP (generación del valor, remuneración del valor, división del valor) y estimular la creatividad que le es inherente. Se desplego una investigación-acción pedagógica donde los estudiantes han utilizado distintas herramientas para imaginar un BM a partir de una idea. Los resultados muestran la reflexividad entre BM y creatividad, puesto que el BM es fuente de creatividad mientras que esta estimula la concepción de BM.

Palabras clave

Business Model, Creatividad, Model GRP, Investigación-acción pedagógica, Mapa mental



INTRODUCTION

The expression Business Model (BM in the rest of the text) has become a buzzword attracting the interest of researchers, whereas it used just to be a term that appeared with Internet start-ups (Magretta, 2002). Although today it has largely surpassed this context to be used no matter the domain (sport, culture, the social and solidarity economy ...) or the nature of the project (business start-up, take over, intrapreneurship, ...) one must bear in mind that the arrival of the Internet unleashed the creative potential of many entrepreneurs who detected a business opportunity there. The novelty of the medium and its actors, often young people passionate about information technology, risked putting off some partners, particularly financial ones, because of the large sums of money that these projects often required. These partners started a quest for meaning to understand the businesses proposed them. To this end, Chesbrough and Rosenbloom (2002) confer a cognitive role on the BM whereby it aims to make sense of business activities in order to make them comprehensible to the markets. Sense, or sens in the original French, is a multi-layered term that also means the direction to take; the BM is thus a strategic concept (Afuah and Tucci, 2001; Shafer, Smith and Linder, 2005). For both of these interpretations, creativity can be considered as inherent to the BM, for entrepreneurs needed to imagine not only what offer to include but also what the pathway to success might be, and then ensure this path was taken by partners providing the project with the resources it needed.

However, creativity is scarcely mentioned in the texts published in intellectual journals, despite them often placing the BM at the heart of their special issues (Long Range Planning, Management, Strategic Entrepreneurship Journal, Revue française de gestion ...) When it come to the entrepreneurial perspective that interests us here, in a recent article which, on the one hand summarizes the definitions, and, on the other hand, proposes research prospects at the intersection between entrepreneurship and the BM, George and Bock (2011) do not mention creativity. However, creativity is considered the genesis of entrepreneurship (Brazeal and Herbert, 1999) whilst the BM can be seen as the artifact explaining the emergence or the organizational impulse (Verstraete and Jouison-Laffitte, 2011). One finds oneself, hence, with the triptych « entrepreneurship–BM–creativity » whereby no one element can be encompassed by the others, nor can be dissociated from them. Warnier, Lecocq and Demil (2012) explain, by the way, that the BM is a support for the creativity of the entrepreneur but their essay, published in a popularization journal, does not include an empirical phase. Our work aims to fill this gap with an empirical research on the creative potential of the BM.

From a theoretical perspective, researchers have conceptualized the BM by drawing on different bodies of work (Timmers, 1998; Gordijn, Akkermans and Vliet, 2000; Magretta, 2002; Chesbrough and Rosenbloom, 2002; Jouison and Verstraete, 2008; Demil and Lecocq, 2008; Verstraete and Jouison-Laffitte, 2009, 2011; etc.). The BM's components have been most studied, its nature is less often revealed in published texts, and its functions are often forgotten. When they are mentioned, the BM is seen as a tool for describing and understanding (Timmers, 1998; Gordijn, Akkermans and Vliet, 2000; Afuah and Tucci, 2001; Applegate, 2001; Magretta, 2002; Hedman and Kalling, 2003; etc.), for forecasting (Applegate, 2001) or for classification (Timmers, 1998; Rappa, 2000). These assertions about its functions are signs that the BM concept's utility has been recognized, but it is more difficult to find non-anecdotal examples that illustrate it concretely, notably in supplying it with content based on its inherent creative potential. Osterwalder and Pigneur (2011) are the exception when, based on their CANVAS model, they propose noting ideas about the components of the BM on Post-it © notes, to be placed on a board that represents the different blocks of their model. We sign up to this perspective, which consists of proposing a method that exploits the creative potential of individuals during the elaboration of a BM.

Working on the creative function of the BM gives our research an



instrumental aim. It is principally addressed to people wishing to teach the BM to future users. These teachers might include an advisor in business creation needing to teach project leaders how to use the tool, or a business consultant updating his client's BM with the intention, for example, of discussing its relevance and later imagining its evolution, or again a teacher training students in initial or higher education. Thus different professions become proof of the educational value of the BM and illustrate it concretely. Although many texts exist on the teaching of entrepreneurship (Béchard and Grégoire, 2005), those concerned with teaching the BM are absent from the main journals. Educators have hence built their teaching protocols without recourse to any academic references founded on empirical research. In the field of entrepreneurship, the difficulty, according to Verzat and Fayolle (2009), resides in the bringing of knowledge to an object that is a creative work in progress (the project). For Hjorth and Johannisson (2009), it is appropriate to show how entrepreneurship is a form of social creativity, and it is not the online context mentioned at the beginning of the text that would make one refute their argument. Our research is hence concerned as much with teaching entrepreneurship via the BM as with the creativity sparked by the BM.

To this end, we have mobilized the mind map to guide both training in the BM concept and the creative elaboration of examples of BM's. Finetuned by Buzan in the 1970's, the mind map is a visual and fun way of representing ideas and stimulating creativity (Buzan and Buzan, 1993; Buzan and Griffiths, 2011). On an academic level, works conducted in different sectors such as, for example, design (Kokotovich, 2008), medical sciences (Noonan, 2012), linguistics (Régnard, 2010; Merchie and Van Keer, 2012), or the economy and management (Budd, 2004; Eriksson and Hauer, 2004) show that the mind map encourages the structured representation of problems, memorization and creativity. In the field of entrepreneurship, Carrier (2008), as well as Carrier, Cadieux and Tremblay (2010), have used it within a framework of searching for business ideas. On a practical level, the mind map has imposed itself as a tool universally used for all sorts of projects, both professional and personal. The existence of numerous virtual communities of « mind mappers », who swap their creations plus free software enabling the easy production of quality mind maps, are witness to this.

Given the potential of the mind map in terms of learning and creativity, on the one hand, and the enormous diversity of its tried and tests application on the other, it seemed relevant to us to assess the BM's use within an educational framework that was respectful of its creative capacities. And so we pose the following research question: does the mind map promote learning of the BM and does it spark creativity during its elaboration?

The educational sciences have shown the complementarity of innovative teaching methods and creative learning (Ferrari, Cachia and Punie, 2009). Here, our work consists both of resorting to an innovative teaching method that is likely to facilitate learning of the BM (create to learn) and of stimulating the creative capacities of trainees for the production of original BM's (learn to create). To respond to this objective, we set up a pedagogical action-research. It was run in Bordeaux at the core of a management-training program at 2nd year Masters level. 31 students shared in the experience within a 45-hour module dedicated to the BM, which presents the nature of the BM, its components and functions. The students placed these functions in different situations to study them. For the functions that increased creativity, a case was presented in minimal detail and the students were to imagine a possible BM for it.

The first section presents the BM and the choice of the mind map to stimulate participants' creativity, whereas the second section presents the associated operational framework and discusses the results obtained. If the response to the research question proves to be positive, the conclusion places certain limits and evokes potential follow-ups to the work presented here.



1. Stimulating creativity to imagine Business Models

The BM takes its place in teaching methods on entrepreneurship and in the accompanying of project leaders. Our proposal does not aim to replace the business plan but considers that the BM is the artifact of an emerging phenomenon that must be understood to better guide and help the entrepreneur imagine the expectations of the stakeholders with whom he is dealing. (1.1). The method deployed must be able to integrate the creative dimension of the BM so that the project leader can deploy his research method and hence imagine possibilities. To this end, we have studied the mind map as a creative tool. Starting from existing work, the benefits and limits of what one can expect from this method in terms of learning are itemized (1.2).

• The Business Model for training in entrepreneurship

The current profusion of publications on the BM might be confusing (George and Bock, 2011), but the notion of 'value' remains very present in the various conceptions and definitions (Jouison, 2008; Eyquem-Renault, 2011). Here are some examples that illustrate the centrality of value in conceptions of the BM:

- the BM concerns the concept of value in the sense that it expresses how value is created, interpreted and exchanged at the heart of a network of stakeholders in a firm (Gordijn, Akkermans and Vliet, 2000);
- the BM describes the content, the structure and the governance of transactions for creating value through the exploitation of a business opportunity (Zott and Amit, 2007);

• the BM is the architecture for a firm and its partner relations, through which it creates, commercializes and delivers value. It is also a relational capital within one or more client segments for generating revenue flows that are profitable and durable (Dubosson-Torbay, Osterwalder and Pigneur, 2002);

- the BM responds to questions regarding the identification of clients, the value brought them for an appropriate cost and the way a business earns money (Magretta, 2002). The answers to these questions eventually form a history of the way a firm operates (Dubosson-Torbay, Osterwalder and Pigneur, 2002);
- the BM describes the way in which value is generated, how remuneration is drawn from it and the way the firm exchanges value with its stakeholders (Verstraete and Jouison-Laffitte, 2009, 2011).

With the arrival of the Internet, entrepreneurs needed to be creative to imagine ways of generating value, drawing remuneration from it and motivating a network to participate in a project by providing it with the necessary resources. It is undeniable that the texts published on the BM rarely place creativity at the heart of their proposals, for creativity so often lies in the shadow of innovation. (Carrier and Gélinas, 2011). Innovation is considered both obvious and as a challenge for managerial teams (Chesbrough, 2006). One must therefore rely on these teams' creativity to generate ideas, for innovation begins with an appeal to creative thinking. (Amabile, Conti, Coon, Larenzi and Herron, 1996).

Eppler and Hoffmann (2012) are interested in the generation of ideas, which they consider to be the first stage in the development of a new BM. They likewise highlight the relevance of a collaborative approach towards the conception of new BM, by which the generation of ideas combines a cognitive and a social process. The authors are hence particularly interested in the role of artifacts in the development of BM, notably in their capacity to supply a structural framework for thought. These artifacts might be objects, models, sketches, etc. Eppler and Hoffmann (2012) affirm that the literature proposes few methods that specifically link creativity to the use of the BM concept, aside from the proposition



of Osterwalder and Pigneur (2011). Despite recognition of this model by academics, the authors note that it has not been the object of scientific investigation, this being their proposed contribution to the model.

The text of Eppler and Hoffmann (2012), which draws on a preceding publication (Eppler, Hoffmann and Bresciani, 2011), is of particular interest here too because it insists on the importance of taking stakeholders into account. The generation of ideas about new BM's leads one to consider and understand positions that risk becoming a source of conflict between potential stakeholders. A method that helps conceive BM's must therefore integrate the different viewpoints of the partners involved. This position is aligned with the conventionalist perspective of Verstraete and Jouison-Laffitte (2009, 2011). According to these authors, the BM is by nature conventional. If resource owners are to come on board, (be their resources tangible, for example a site, machines, funds, etc. or intangible, such as a brand, a reputation, etc.) then it is appropriate to integrate the expectations of these potential stakeholders into the business artifact (the BM). A collective and shared representation of what the business is will enable the firm to get started. The BM is the medium for expressing a vision of the « common world » to the multiple stakeholders who will make up the firm. And so it becomes a convention relating to the Generation of value, the Remuneration of value and to Value Partnerships with stakeholders, whereby the concept of value adapts to each partner with whom an exchange is set up. Hence the authors speak of a GRP model. This conception of the BM encourages one to consider yet further the involvement of stakeholders without whom the convention would not emerge, as no shared or shareable value would have been identified. Entrepreneurship is fundamentally an act of partnership; a project is not so much a creator and his idea taking on the world, as a body of partners with different expectations that have crystalized around a common project.

This conception, which joins other positions placing the notion of value at the heart of the BM, breaks away from most teaching carried out in the domain of entrepreneurship, and most particularly in the field of business creation. The most recent undertakings there are based on the notion of the business plan, which admittedly is now under review (Gumpert, 2002; Dondi, 2008). All the same, no matter what people say, the business plan is still required by some partners, particularly those working in finance. The business plan is a document that presents the project in detail, principally dealing with the market and the financial consequences of releasing the spending (costs and investments) required to achieve turnover, the difference between the two becoming the basis of a promise that the project will attain a positive (or at least a balanced) set of accounts. Yet, practice reveals cases of funding when a business plan has not even been drawn up. The idea is not to say that formalization is not useful (Delmar and Shane, 2004), but to consider that although the exercise is helpful for fine-tuning a business, any belief that turnover forecasts have a rational basis, is illusory. (Gumpert, 2002). It is worth pointing out that some contexts dispense with this kind of practice and yet unquestionably produce forms of entrepreneurship (eg. the informal sector in some African countries). The organizational impulse is surely explained by something else: the emergence of a convention. In their theories on this view, Verstraete and Jouison-Laffitte (2011) draw on the works of Gartner (1995), on the one hand, and on conventions theory, on the other.

Our objective, a more instrumental one, adopts this perspective to consider that it is not unreasonable to bring knowledge about the BM to project leaders. In fact, this tool can help them understand that the emergence of a convention constitutes the genesis of the phenomenon to which they wish to give birth. The problem faced by educators, be they advisors or teachers, is how to foster learning of the BM without forgetting its inherent creativity. Our research responds to this problem. We deploy a tool, the mental map, to channel creative thinking with a view to teaching the BM for the construction of a project, without omitting to assess its creative potential

• Mind mapping as a creative tool for use in an educational context

Writers on management have worked to fine-tune heuristic initiatives,



calling upon intuition, imagination and individual judgment. Piattelli-Palmarini (1995) remind us that the word "heuristic" shares the same root as "eureka", both being linked to the Greek verb that means 'to find'. "Globally speaking, heuristics are specific mental strategies that help solve specific problems ... a heuristic is a simple and approximate rule – explicit or implicit, conscious or unconscious – which enables the easier resolution of a given category of problems. (Piattelli-Palmarini, 1995, p. 35). Desreumaux (1993) distinguishes heuristic initiatives from analytical initiatives, these being more inscribed into rational thought, even though any decision will ultimately be guided by interpretation. According to Desreumaux (1993), analytical initiatives have the inconvenience of impeding creative usage, whereas heuristic initiatives make it possible to formulate a larger number of solutions to problems faced; they integrate non-quantifiable elements more easily and they take cognitive patterns into account.

Dealing specifically with creativity, Carrier (1997) links it to entrepreneurship and intrapreneurship. She evokes the mind map, which she deploys in an article aiming to propose a method to help potential entrepreneurs explore the possibilities opened up by their ideas, before embarking on the more rigorous process of preparing a business plan. (Carrier, 2008). Here we meet one of the issues of our research question. The production of a mental map starts with a central idea, represented (manually or with the help of software) at the center of a support medium (paper or on screen). This point of departure generates associations with other ideas, which attach themselves around the center in a radiant structure that also subdivides into as many branches as there are new ideas. The mental map represented below for illustrative purposes, was drawn manually (Figure 1). Its central subject concerns precisely the production of a mental map.

A mental map activates both hemispheres of the brain. The right side of the brain stimulates images, colors, creativity, etc.; the left side is for logic, words, structure, etc. Buzan and Griffiths (2011) describe the mental map as a cartography of our thoughts, capable of constituting



Figure 1. An example of a mind map (this mindmap was created by Jane Genovese)

an advanced tool for developing creativity, organizing ideas even while we take notes or structure a project, and facilitating learning and memorization. The tool has not passed educators by. Although there is no shortage of teaching experiences recounted online and they provide illustrations of mind maps that compete in aesthetic appeal, it is rare to find any that reveal a scientific research framework. Later, we will present the few significant works whose method (research conducted with students and lecturers within a university environment) and/ or field of application (economics and management) approaches our own remit. They enable us to define the potential benefits as well as the limits of using mind maps in a learning process.

Two investigations resemble our research framework in that their



mind maps are based on conveying specific content. Thus, Eriksson and Hauer (2004) revisit the content of a general introductory course on marketing by combining fundamental know-how with problem solving. Based on a folder of articles from the specialist press, they ask students at Masters level in a Swedish university to deduce key marketing concepts and to translate them into the form of 4 mind maps (for diagnostics, opportunity, strategy and client relationship management). Here, the mind maps serve to structure and synthesize ideas. They are then reused as a creative toolkit to conceive a full marketing plan in an applied case where thinking out of the box is encouraged, as is proposing networks of key concepts. The educational improvements obtained are not found in exam results, according to the authors. These remain comparable to those of previous years. The gains are to be found in students' sense of involvement and their increased motivation.

In a similar way, students participating in the protocol deployed by Budd (2004) had already been theoretically taught the economics of the subjects they would treat with mind maps (trade union-employer negotiations and the macro-economic balance between offer and demand). Producing a mind map is no substitute for teaching concepts classically, but it does enable these concepts to be revisited. It also expands discussion in an open way, in a context specified by the teacher. The gains highlighted by Budd (2004) are of at least two sorts. First, producing a mind map is an active teaching method: it provides each learner with the possibility of thinking for themself, unlike magisterial teaching where the lesson is followed more passively. This can facilitate the acquisition of theoretical know-how. What's more, the visual nature of the mind map (drawings, colors) is particularly suitable for students whose learning style is more visual than auditory, as is shown by the results of a quantitative survey conducted by the author. The second gain concerns the dynamic of the group. Exercises in mind mapping, in limited groups, promote interaction both between students and between students and teacher.

This collaborative learning helps break the monotony of sessions and makes a six-month course more dynamic.

Nevertheless, the deployment of mind maps in an educational context does not always lean on the teaching of fundamental knowhow. In fact, in the works of Carrier (2008) and Carrier, Cadieux and Tremblay (2010), the mind map's goal is pure conceptualization. When linked to other techniques in creativity, it can help students/ project leaders freely explore their business ideas or imagine new business opportunities. Although the mind maps used by these authors present a degree of freedom that is far superior to the previous works cited, because they are disconnected from the content of lessons, their experiments come just as close to our intent here. They have their place within entrepreneurship research. They address a public of project leaders and they intervene in stages that are upstream of the entrepreneurial process of fine-tuning ideas and searching for business opportunities. Their results show that the mind map is a fertile technique, producing an important number of new business ideas. Creativity is facilitated by the fact that participants feel at ease with the method. Although the ideas produced are rarely at odds with the dominant paradigm, being more concerned with improvements or adaptations to existing products, they are judged no less promising by the independent expert brought in to evaluate the results of the experimentation (Carrier, Cadieux and Tremblay, 2010). This result conforms to the typology of McFadzean (1998) who classes creativity techniques into three categories: those that preserve the dominant paradigm, those that enable the extension of this paradigm and, finally, those that break the paradigm and enable the generation of the most creative solutions. The more a technique takes participants out of their comfort zone, the more likely they are to produce original ideas. The mind map is situated in the first category. It does not lead to the most novel ideas. On the other hand, as McFadzean (1998) stresses, the methods of the first category are also those most easily adopted by groups insofar as they are easy to understand and transmit. They



require no previous experience and they do not take participants out of their comfort zone. In this sense, the mind map seems particularly suitable for an initiation into creativity methods. From the point of view of the students who used the tool, Carrier (2008) highlights three categories of perceived benefits. The first is related to the intrinsic characteristics of the method (the chance to visualize and reveal links, ease of use); the second is about collaborative work (the mind maps were produced in limited groups to facilitate the pooling of different experiences, including those of the experts); the third goes back to emancipatory nature of the technique, which liberates the creative potential of individuals and enables them to see their project from a different angle and to clarify it. This last point touches on the work of Kokotovich (2008), which shows the relevance of mind maps for stimulating the creativity of novice industrial designers in the finetuning of new products. In particular, the links between the different components of a mind map fuel creativity and authorize problem solving in a holistic and complex way.

Everekli, Balim and Inel (2009) are interested from the teachers' point of view. In a qualitative study, they questioned a sample group of teachers on their perception of the mind map. The results reveal that educators perceive the mind map as a tool that complements scientific teaching, it is appropriate for memorizing and evaluating knowledge, and is useful for motivating a group and checking that knowledge has been acquired, normally at the end of an educational cycle. Amongst the limits cited, the authors highlight the fear that learners are distracted and a residual sentiment that mind mapping cannot be used in all scientific subjects.

Despite certain limits, the mind map proves fruitful in an educational context. The confrontation with previous research enables us to list the expected benefits and limits of mind mapping in this context (Table 1).

Expected or observed educational benefits	Limits
Facilitates learning (process) Active learning Visual learning Collaborative learning Responds to different learning styles Enables mistakes in comprehension to be identified Facilitates and increases memorization	Less suitable for students with an auditory learning style No substitute for presenting key concepts Not adapted to all subjects
Improves acquisition of know-how (result) Improves learners' grades Improves students' attitude to discipline	Does not improve learners' grades
Develops creativity Emancipatory character of the technique Generates new ideas Generates associations between ideas Promotes networks of links between concepts	The ideas produced are unlikely to produce any innovation or rupture with the dominant paradigm
Enables the organization of ideas/material Structure Synthesis	There are often so many branches and nodes that the map is difficult to read
Facilitates group dynamics (learning conditions) Collaborative learning Creates a fun environment Enables each person to express themselves Motivates the group Easy to understand and to teach Keeps participants in their comfort zone Gives a new boost to lessons during the semester	Mental block about drawing Chaos in the classroom/ disorderly work environment

Table 1. The mind map in an educational context: benefits and potential limits

The table was built from the following sources: Buzan and Griffiths (2011); Budd (2004); Carrier (2008); Eriksson and Hauer (2004); Carrier, Cadieux and Tremblay (2010); Everekli, Balim and Inel (2009); McFadzean (1998); Kokotovich (2008); Régnard (2010).

These listed benefits combine to serve our objective of learning the BM and using creativity in its elaboration. Moreover, we observe that



the use of the tool in a group heightened the stimulation of creativity in all the cases appraised. This list does not claim to be exhaustive, but it does provide an initial grid analysis for preparing the operational framework of our action-research.

2. The operational framework: a pedagogical actionresearch

Does the mind map promote learning of the BM and does it spark creativity during its elaboration? We set up an action-research to answer this question. In an educational context, Lindsay, Breen and Jenkins (2002) remind us that the main aim of an action-research is "to solve a problem at the heart of a research process; [...] it contributes both to pedagogical know-how and to a substantial modification in the educational practice of the teacher and the students' learning process". In this sense, as much the departure point of our research (filling the gap of a creativity method applicable to the BM) as our objectives (introducing mind mapping into the educational practice of the team so as to improve students' learning process and stimulate their creativity) fit the framework of an action-research.

In section 2.1, we describe the protocol of the action-research that guided the experimentation. Section 2.2 presents results and raises points for discussion.

2.1. The stages of the action-research

Susman et Evered (1978) stand up against the sophistication of research methods in social sciences that produce results that are unusable by the actors in the fields studied, notably because the work is too far removed from the real problems they face. They propose that operating frameworks integrate a common definition of the problems to tackle, this explanation being endorsed by a broader action-research protocol. "The action-research is a qualitative research method of a participative nature whereby the researcher voluntarily gets involved in the social systems he is studying and, as a result, can appreciate the evolution of a situation and behaviors." (Jouison-Laffitte, 2009). We draw upon the cyclical process of Susman and Evered (1978), which describes the action-research as a 5-phase cycle (Figure 2 for a reminder of the 5 phases. Table 2 for their application to our research).



Figure 2. The cyclical process of the action-research (Susman and Evered, 1978, p. 588)



Date	Stage	Content
1. ldentification of the problem	University year 2011-2012	Demand by students and the educational team for a creativity method around the BM, as understood using the GRP model.
2. Discussion of the problem and action planning	June 2012	Content elaborated for the training module "Business Model," incorporating two sessions on "BM and creativity".
Discussion of the problem and action planning	November 2013	Meetings between researchers on the entrepreneurial team (also on the educational team) to explore the different creativity methods available and applicable to the BM. Three methods were selected; the content of the session « BM and creativity » was halted.
3. Action roll out	January 25th to February 22nd 2013	Roll out of the « Business Model » module to 31 management students at Masters level.
4. Evaluation of the action	February 5th to February 22nd 2013	Qualitative survey of the students Evaluation of the seminar content (individual, written examinations).
5. Learning process, general results	February 22nd 2013 March 2013	Results returned to the research team. Finalization of this article to make public the improvement observed in students' learning.

Table 2. The stages of the pedagogical action-research

Stage 1. Diagnosis of the situation. What problem was identified?

The introduction of the BM to educational practices in entrepreneurship training at Bordeaux University (professional degree and 2nd year Masters) has for several years demonstrated its relevance and potential, as much for students and project leaders as for the professionals responsible for evaluating their projects. Thanks to the structured formalization led by the GRP model (Table 3), the projects presented at the end of the year have gained in intelligibility while project leaders have visibly improved their powers of conviction (Verstraete and Jouison-Laffitte, 2009).

Components	Elements	Examples of content
Generation of value	Entrepreneur(s) or entrepreneurial project leader(s)	 History Profile Motivations Experiences Ambitions Entourage Etc.
	The value proposition	 Idea (source, fine-tuning, protection) Market (attractiveness, target, competitors) Ambition Etc.
	Value manufacture	 Capturing resources Organizing resources Delivering value
Remuneration of value	Sources of remuneration	 The channels through which revenues reach the firm Payers Etc.
	Volume of remuneration	• Turnover • Market share • Etc.
	Performances	 Financial performances Non-financial performances (reputation)
Value Partnership	Ecosystem	 How value is distributed within the ecosystem Participation in this ecosystem and its impact on value distribution Etc.
	Conventions	 Conventions of the ecosystem (in the business world, the business sector, those determining stakeholder behavior) Etc.
	Stakeholders	 Identification of stakeholders (actual or potential) Optimization of value exchanges with them (win-win) Table of stakeholders Etc.

Table 3. The components of the Business Model according toVerstraete and Jouison-Laffitte

The 9 elements of the GRP model constitute the fabric of the BM that every student must formalize within their project (written in 9 pages, 1 page for each element). Although the formalization of the BM in narrative form constitutes an undeniable help in the written and oral presentation of real case studies, exchanges between students and the educational team during the university year 2011-12 nevertheless highlighted several complementary needs. These concern the initial phase of learning about the BM, well upstream of the formalization and defense of the business plan. Students and teacher-researchers formulated these needs around two axes, which can be summarized as follows:

• "How can we accompany the fine-tuning of the BM with a creativity method that explores various possible BM's and helps conceive original ones?" (teacher-researchers)

• "How can one make a coherent BM emerge from a simple idea?" (student-project leaders)

• "The students understand the 9 elements of the GRP grid but, at the beginning, they have a hard time linking them and seeing the overlaps. How can one materialize links between the elements so that students can quickly grasp the BM as a system?" (teacherresearchers)

In other words, expectations are voiced in favor of integrating, within the teaching practice of BM learning, one or more creativity tools that would reach a successful conclusion with the systematic representation of a BM under construction.

Stage 2. Action planning. *What possible solutions are there to solve the problem?*

To meet the expectations that had been voiced, various solutions were compiled during exchanges (informal and at meetings) within the educational team of teacher-researchers and professionals.

The first solution consists of continuing with the usual tools for fine-tuning a BM. The educational team particularly concentrates on representing the business network to help students identify the essential actors who will provide the tangible and intangible resources their project needs.

The second solution completes the narrative form evoked earlier, and it has appreciable relevance for relatively well-evolved projects, although it would doubtless be premature to use it at the beginning of a study. It consists of formalizing a more summary version of the GRP in the form of a chart with 9 boxes, each one describing in one paragraph, an element of the GRP. For each element, the chart would integrate a summary of positive points (the "Pluses"), negative points (the "Minuses") and points that it would be interesting to develop further (the "Interesting"), in the spirit of the Plus, Minus and Interesting method (Carrier, 1997). The team used this form of summary representation of the BM (9 boxes intersected with the PMI method) in the context of their case studies, where it was appreciated by entrepreneurs who had offered their firms as a research field. The idea is hence to propose this form of representation to students.

The third solution discussed by the educational team draws on a protocol consisting of placing *Post-it* © notes on a surface that reproduces the scheme of the work. The method, fine-tuned by Osterwalder and Pigneur (2011) proceeds like this with the CANVAS model. Seeing as there is no inherent originality in placing *Post-it* © notes on a surface, we imagined reproducing the GRP grid in the form of a wall chart or a large-format sheet of paper that could receive small, colored papers on which participants would lodge their ideas.

A fourth solution was imagined. It proposes adopting the mind map to represent the GRP model at the center of a map and so integrate it into an innovative teaching method.



The radiant structure of the mind map makes it particularly adaptable to the GRP model, whose shape it can mold (three branches, each divided into three sub-branches). Moreover, the production of a mental map enables a user to combine ideas and imagine links between elements that can be materialized on the support.

At this stage in our research, the need to respond to the concerns voiced became urgent because the team of teacher-researchers was assigned the task of updating, in the short-term, a 45-hour module in BM training destined for an audience of management students at 2nd year Masters level, the seminar incorporating a day on "the Business Model and creativity".

Stage 3. Action. What is the chosen solution and how is it put into effect?

The creativity session took place on February 5th 2013 with 31 management students in a French higher education institution. All were enrolled in the "Business Model" module of their course (2nd year Masters, initial training). The group encompassed 24 male and 7 female students with an average age of 23. During a preliminary session introducing the module, the students attended a general presentation on the BM, its nature, its components and its functions. Thus the pre-requisites of the creativity session included prior knowledge of the GRP model and other models (including CANVAS) and students were also required to have read some research articles on the BM. A choice of representations of a BM was presented and explained to the students (narrative form, 9-box chart form with PMI, mind map form), based on a real case study constructed by the pedagogical team. It told the story of an entrepreneur in the region who - from his garage - had developed a wine production business that is now known all over the world.



The creativity session resumed the roll out of a typical session imagined by the team, based on the alternatives mentioned earlier. Solution 3 (Post-it © on a board) was ruled out, because some team members who had taken part in a seminar using this way of proceeding were not enthusiastic about the prospect of doing the same thing with the GRP model. However, the three other solutions were proposed in parallel to all the students, based on the following scenario. Provided with a minicase study of a business idea that was deliberately left very sketchy, the students, in groups of 5 or 6, were instructed to help the project leader fine-tune her BM. To conceive a relevant BM ex nihilo, the students were introduced to three different tools. As such, they needed to produce: 1/ The most developed business network possible for the starting idea, by materializing the exchanges between stakeholders; 2) A summary chart with 9 boxes for the 9 components of the GRP, each one coupled with a diagnosis using the PMI method; 3) the mind map knocked into a BM based on the generic components of the GRP model so as to imagine both content and links. The initial structure of the mind map was provided,



but participants were then invited to complete freely the sub-divisions of each branch (Figure 3, in which one revisits the components of table 3).



Figure 3. The core of a mind map based on the GRP model

The business idea selected to test our solutions can deliberately be summarized in just one phrase: "Sophie, a young mother and trained physiotherapist, decides to open a massage practice in a large French conurbation. Help her imagine an original BM." Note that, for the experience, the nature of the business idea has little importance in itself. Above all and, in response to voiced needs, it is for testing the capacity of several tools to stimulate the creativity of participants in the construction of BM's. After explaining the instructions and presenting the tools (30 minutes), the teacher-researcher in charge of running the session accompanied the students in their collective productions for 3 hours. Colored pens and A3 sheets of paper were made available. At the end of this work, for 1 ¹/₂ hours in the afternoon, the final documents were drawn up and the BM's were projected to the whole group. And so the day consisted of two time-periods (production in small groups then reproduction with the whole class), taking a total of 5 hours.

Stage 4. Evaluation of the action. *What are the consequences of the action?*

The session became the object of 4 types of evaluation concerning the students and the teacher-researchers who had imagined the teaching content. First, as they exited the session, each student filled out an anonymous evaluation questionnaire. The questionnaire aims to analyze, qualitatively, the students' feelings about the session generally and also about the specific contribution of each of the three tools they had tried out (Annex 1).

Second, the students filled out another evaluation questionnaire from their administration. This questionnaire is particular to their establishment. It is systematically addressed to students at the end of a module.

Third, the content of the "Business Model" module was the subject of an individual, written test. The topic treated resembled the experience undertaken in class. In 2 hours, after summarizing the relevance of the BM, students had to imagine and represent as a mind map the BM of Paul, employee of a pancake house in Lille, who wishes to leave his boss to start up his own restaurant.

Finally, the teacher-researcher who led the session took notes during the educational face-to-face about her impressions and pathways for improvement, which she shared with the co-author of this article.

Stage 5. Specification of the learning process. *What are the general results for students, speakers and researchers?*

An analysis of the questionnaires filled out by participants (content



analysis and confrontation with the literature review) has brought several contributions to light, concerning the learning process of the GRP model and creativity in the elaboration of BM's. These results were reproduced in the form of a presentation to members of the teacher-researcher team in entrepreneurship. The educational method used aroused a lot of enthusiasm from colleagues, and particularly the recourse to mind mapping. It was collectively decided to maintain this tried and tested approach for future teaching and to give value to the pedagogical action-research process in the form of an article, so as to highlight its results. These are developed and discussed in section 2.2.

2.2. Results and discussion: analysis of participants' feedback and their production during the trial

Questionnaires filled in by the 31 students about what they gained from the session, were the object of a manual, thematic content analysis. Although the literature review had enabled the advantages and potential limits of mind mapping to be listed in educational terms, its coding was carried out freely, with no *a priori* definition of categories. The results of the analysis of the creativity session as a whole are illustrated in annex 2. Here, we are interested in comparing the three tools proposed so as to measure their respective contributions to our objectives (2.2.1) and then evaluating the content of the BM's that were produced thanks to the mind map (2.2.2).

2.2.1. Comparison of the three tools for fine-tuning the BM

Each student successively evaluated the three tools for fine-tuning the BM by declaring the tool they had most preferred and indicating the reasons for their choice. Table 4 summarizes the opinions gathered, in a way that enables them to be compared.

Way of representing the BM (preference)	Categories (occurrences) – examples taken from the feedback
Mind map (25)	Clear and comprehensible vision of the BM (24):
	Clear vision/comprehensible/legible/visual/clarifies ideas/ transparent/ overview/learning the mind mapping technique particular attracted me: it simplifies the GRP/understanding the GRP thanks to the visualization that the mind map provides/l visualized the BM via the mind map with drawings, colors, texts
	Facilitates memorization (11): the mind map is great for all these mnemonic things
	Creativity (10): the mind map is great for all these mnemonic things
	Fun (5) - Interesting (3)
	Useful (5): useful for understanding the GRP model.
	Complete (4): exhaustive/stops from forgetting anything
	Easy (4): the ideas string together easily
	Organization of ideas (4): logical/organized/ ranked
	Practical (2)
	Original (1)
	Enriching (1): the technique is clear and can be reused in other contexts, reusable.
	Beautiful (1)
	Limits (5): takes a long time to produce/have to produce it yourself for it to be exploitable and useful/useful if well produced, but not obvious how to make one
Business network map (2)	Understand the stakeholders (SK) and discover the relationships between them (12): clearly defines the SK/clarifies the P aspect of the GRP/ideal for stock-taking/makes a link between the SK/the most important, because without SK, no business/important to see the SK, their role and their relationships
	Efficient (12): quick/useful/essential practice/interesting
	Simple/Clear (9)
	Creativity (5): necessary to think up some SK that we would not have envisaged/brainstorming support/the more you build branches and interactions, the more opportunities you notice
	Getting started (4): <i>initial (it's a beginning)/practical for getting the hang of it/gets the first ideas flowing/ necessary for the next two stages</i>
	Visual (4): you start seeing the global structure of the firm
	Fun (1)
	Limits (7): not always obvious/incomplete/insufficient when taken in isolation/simplistic/so many interactions that this tool can become rough and complicated



9 -box chart: GRP + PMI (2)	Complete (9): enables all the information about a project to be mentioned/ enables one to grasp the different elements of the GRP model and not forget anything
	Value of the diagnosis (7): it was a good idea to look at the positive and negative aspects of our project/enables confirmation of the path to follow/good view of eventual obstacles, objectives to reach and conceivable solutions/enables one to evaluate the BM and discover its value
	Precise (7): think in a precise way/detailed
	Useful (6): very important/essential/very instructive/enabled me to memorize the business' situation and to present it better in the oral
	Overview (4): summary/descriptive
	Contained (4): Cartesian/ordered/rigorous/organized.
	Developed (3): more advanced thinking/one deepens the topic/enables one to "divide up" the project
	Limits (19): difficult to apply PMI/not very comfortable with this model, I find it too rigid/long/complicated/fastidious/opaque/PMI is complicated/difficult to use/not great/too academic/doesn't enable one to see relationships between the different parts of the BM in a single glance/less creative/theoretical.
No preference (2)	No real preference, the three tools are complementary.

Table 4. Perception of the three tools deployed

These results sanction the mind map as the favored tool for elaborating a BM (25 out of 31 students prefer it over the other two). Our pedagogical objective was to improve the BM learning process while respecting the creativity inherent within it. The content analysis shows that this objective has been reached and that it concerns two of the most prominent benefits of the mind mapping experience: "clear comprehensibility" and "creativity" arriving top of the list of quotations associated with this tool.

What's more, to a very large majority, the participants spontaneously wrote that the mind map enabled them to understand the GRP model better. As one respondent writes, for example: "*learning the mind mapping technique particular attracted me: it simplifies the GRP*." Our results suggest a principal vector for explaining ease of learning. In fact, comprehension of the GRP via the mind map seems to pass via the visualization of the BM, a source of clarity. The comments, "*understanding the GRP thanks to the visualization that the mind map provides*" and "*I preferred the mind map because it provides a very clear overall vision*" echo the recurrent usage of the terms "visual", "clear", even "transparent," as if the visualization of

the GRP model in the form of a mind map is self-explanatory and does not demand the slightest cognitive effort. This is an interesting point, because it refers directly to a growing literature on the relevance of visualization to management (Zhang, 2012; Eppler and Bresciani, 2013). In the tradition of the best-seller publication of Roam (2008), these authors plead for a more frequent recourse to the very broad palette of visualization techniques in management, which go well beyond classic diagrams (symbols, drawings, shapes, colors, prototypes, metaphors, conceptual diagrams, maps, 3D avatars, etc.) *A minima*, visualization enables managers to summarize and master the overabundance of information with which they are confronted (Zhang, 2012). With more ambition, visual objects can also have value as catalyzers in the collaboration between managers, to the extent that they improve communication and the co-construction of knowledge (Eppler and Bresciani, 2013).

In our experience, the mind map has played the double role attributed to visual objects. It has enabled an efficient summary of the different parts of the GRP model (*"for once, one could see what one was dealing with", "I could see things in an image rather than on a list", "I visualized the BM via the mind map with drawings, colors, texts"*). It likewise reinforced collaborative exchanges between participants (*"confronting your ideas with other people's", "we helped each other with the ideas"*). In the literature on visual communication, it goes without saying that aesthetic appeal has its place in management. The literature goes so far as advocating the introduction of art and design courses into management training programs so as to train students' eyes and nourish their creativity (Zhang, 2012; Baker and Baker, 2012). Unlike the other two tools, the mind map fully actions the aesthetic dimension that characterizes it, through colors and drawings. The students are, on the whole, proud of their productions in terms of content, but also in aesthetic terms; they judge them to be *"beautiful"*.

The theme of creativity is more apparent in responses concerning the mind map than those concerning the other two tools (*"finding ideas that would not have come on their own"*; *"developing aspects that I had not been aware of"*). The students particularly liked starting from a very succinct statement (*"starting from nothing"*) that freed them up to imagine the BM better. Although we had imposed the GRP grid as a framework for the mind map, this was not seen as a constraint. We were surprised to observe that several participants had, on the contrary, experienced a sense of freedom in their creative thinking (*"free creation around a project"*, *"no limits were set on creativity"*). One of the factors at the origin of this perceived creativity might be the fun nature of the tool, apparent in the responses (*"the mind map is fun, not many words,"* as opposed to the 9-box chart described as *"Cartesian"* and *"fastidious, although useful"*). Through play, the individual frees themself from certain creative blocks (Kelly and Kelly, 2012) such as fear of judgment (the experience is presented as a game that will not be graded) or fear of taking the first step (one begins by filling in one branch, then another and then another in small steps). The fun aspect of the tool contributes, additionally, to setting up a good group dynamic, which in itself is likely to produce greater creativity. This point was noticed by the teacher and expressed by the students. It confirms the results of Budd (2004) and Carrier (2008).

When it comes to representing links between elements, as the pedagogical team wished, the mind map proves to be better perceived than the other two tools. Participants describe it as a "complete and complex modeling of what separates and what links all the elements". The links become visible: they are drawn between the branches of the different components, accentuating the fact that the BM, as understood through the GRP model, is a system whose parts cannot be dissociated (Figure 3a). One of the mental map's strengths is the way it authorizes both a summary and a detailed analysis. An individual can zoom on the sub-divisions of each element and see any interconnections between them. The mind map is hence considered to be "complete", "exhaustive" and "interactive", quite the opposite of the business network map or 9-box chart.

An additional and unexpected benefit emerged. When it came to presenting a BM that his group had fine-tuned to other students, one student successfully used the mind map to support his narrative of the BM ("it's as if one were telling a story from drawings"). In an oral effort of conviction, the mind map proved useful for effectively communicating a BM to other people. The use of the mind map as a communication tool for third parties (starting with stakeholders), takes us back to the conventionalist perspective of the BM evoked earlier. If the BM is the artifact that permits the crystallizing of the convention between project leader and stakeholders, then the mind map seems to be a promising tool for making the BM apparent and for accessing

it from different viewpoints. Countering this claim, Régnard (2010) points out as a limit the fact that "the legibility of the heuristic map is not obvious, especially for someone who is not in the habit of handling this tool ... [Maps] are not intended for broad distribution because they are generally dense [...], and so fairly unpractical to read » (p.221). The authors propose distinguishing between two kinds of map production, one where the map is for personal use and the other where it is destined for other people, this often leading to a rework, to improve clarity and aesthetic appeal. Given the existence of arguments to the contrary, it is worth testing the hypothesis that the mind map improves both the representation of the BM and the sharing of this representation between stakeholders. Literature on boundary objects provides an interesting illumination of this point. The concept considers objects (abstract or concrete) found at the intersection of several social worlds that are capable of being shared by different groups. According to Star and Griesemer (1989), the originators of the concept, a boundary object is robust enough to remain a unit and a terrain of exchange between different groups, while keeping its flexibility; it acts as a shared context while authorizing singular interpretations, each group able to find a meaning in it that meets their needs. Doganova and Evquem-Renault (2009) summoned this literature to qualify the Business Model, seeing it as an object that co-ordinates action between the entrepreneur and the multiple components of his environment. Models, maps and other visual objects can equally be considered as boundary objects depending on their context (Carlile, 2002; Eppler and Hoffmann, 2012). And so, in representing the GRP model in the form of a mind map, we have potentially combined two kinds of boundary objects. Following Carlile (2002), who showed that the effectiveness of boundary objects depended on their nature and on context, future research in real situations would gain by testing the contribution of the tool apprehended from this angle.

A final, unexpected result crops up very visibly in the commentaries. We had proposed the objects by placing them in competition with one another. Yet, despite what we had thought, the students underlined above all the interest in using them together. Although they vastly preferred the mind map, this appeared to them as the culmination of the two previous tools (*"it all seemed useful to me: each stage partially prepared the next one"*). One student orally confided to the teacher-researcher: *"starting from nothing, we build a labyrinthine system with the business network map, then we filter with the 9 boxes and we arrive at a clear and synthesized final result with the*



mind map." One of other groups went so far as to materialize this overlap by including the business network map it had already developed, within the 'P' part of its mind map. As such, the business network map seems to lend itself very well to kick-starting a creativity session on the BM ("getting started"). It makes learners fully aware that a creator never undertakes starting a business on their own and that the entrepreneurial act is fundamentally based on partnership ("important to see the stakeholders, their role and their relationships, without the stakeholders no business"). With the 9-box chart, the students found material for going deeper, beyond the limits of the previous exercise. The difficulty they encountered, far from hindering them, had a stimulating effect, their commentaries associating the difficulties with the benefits one could draw from the exercise ("difficult, but essential"). The interest of diagnosing by the PMI method was notably highlighted. It led the students to question the viability of their idea, promoting decision-making ("good view of eventual obstacles, objectives to reach and conceivable solutions/enables one to evaluate the BM and discover its value"). Note that two students refused to give their preference, explicitly expressing the complementarity of the tools evoked earlier: "no particular preference. the three tools are complementary".

2.2.2. Evaluation of the BM content produced

An observation of the students' productions reveals interesting results. In the first place, the BM's produced do not resemble one another in their shape (and this despite having an identical core map) nor in their content. Starting with the same idea, the exercise promoted the emergence of a variety of BM's. As such, the students much appreciated us placing the different mind maps side by side at the close of the session, insofar as establishing the series showed flagrant and surprising differences between the 6 BM's they had imagined. We reproduce two examples of them below (Figures 3a and 3b).

The differences in the proposed exercise are particularly acute in the 'P' part, concerning the value architecture and the way in which the business creator positions herself within an existing ecosystem (reliance on existing care structures, doctors, pediatricians, maternity wards, midwives, etc.) or, taking an opposite approach, in her willingness to overthrow existing conventions of baby care with an innovative practice as an alternative to traditional medicine.





Figures 3a and 3b. Examples of BM represented in the form of mind maps





This variety of BM's provided by the mind map is likewise present in the individual, final exam scripts, where it translates into some highly varied concepts of pancake houses (bio pancakes, fast food pancakes, truck pancakes, takeaways, pancake home deliveries, gastronomic pancake restaurant, etc.).

In a general way, it seemed to the pedagogical team that creativity was principally expressed in the articulation between the value proposition, revenue sources and favorable partnerships. The mind map called for completing the sub-divisions of these elements with new branches and then linking them. As such, in the "baby massage" case, the creator could content herself with her natural target market, namely parents concerned about their link with their child, who have the financial means to pay for a one-on-one service. On the contrary, the mind map invites reflection about other, less obvious sources of revenue (training? Group classes? Conferences?). What if the users were not the payers? How could she reach less advantaged social classes? Can one establish links with local and regional authorities with responsibility for children? Why might they be interested in subsidizing the creator? Couldn't the main manufacturers of care products, identified in the manufacturing of value, sponsor her and help her open the doors of the maternity wards, where they are already present? Bit by bit, the mind map applied to the GRP model leads one to explore possibilities and to fine-tune the initial idea. Links appear with new stakeholders, and sometimes between stakeholders, often proving to be surprising, and sometimes fruitful. A system takes shape, which itself generates new business. In this sense, the creativity observed matches the results of Carrier, Cadieux and Tremblay (2010), conforming to the typology of McFadzean (1998). The mind map does not lead (at least not here) to innovations that cause rupture, but it has enabled a considerable enriching of the initial idea and the emergence of opportunities, some of which seem promising.

Another limit of the mind map appeared during the experimentation. Although one can produce a mind map without knowing how to draw, (artistic talent is not the gauge of a good map), the process can put off people who are reticent in drawing or who feel, doubtless wrongly, that they are not good at it. We observed this with one group that managed to overcome its initial block, but remained unsatisfied with the aesthetic appeal of the final result.

The results obtained, although clearly in favor of the mind map, call for a final comment about the method deployed. We had made the choice here to combine different tools, asking each of the 6 groups of students to test them all together. Yet, without further experimentation, our choice does not confirm that the results obtained are exempt from bias. Would the results have been similar if the mind map had been handled on its own (that is to say, without the business network map or the "9-box" chart)? Only by dissociating the evaluations could we answer this question. As such, Carrier, Cadieux and Tremblay (2010) separately compare three creativity methods (mind map, favorite object, wishful thinking). In their experimentation, the three methods are tested in parallel by three different groups of students (each group of 12 people tests just one of the three methods). Nevertheless, getting the same subjects to handle all the different tools presents at least two advantages. In the first place, it means we can ensure that differences in the tools' evaluations are not caused by an inherent particularity of one of the groups, be it concerning the personality of group members or the group dynamic installed. This is an important point because the opposite situation, of evaluating the methods separately with just one group per method, does not rule out having the method tested by an atypical group. In the second place, combining the tests enables a multiplication of the number of evaluations without multiplying the number of respondents. Instead of collecting 10 or 11 evaluations for each of the 3 tools, we collected 93 evaluations in total, 31 for each method.

These advantages justify the recourse to a combined evaluation of the tools. Incidentally, this is a very popular choice in business science, particularly in marketing. Resorting to a plan of experience with repeated



measures is an efficient method of reproducing the real conditions of a product purchase (Van Horen and Pieters, 2012a, 2012b) or exposure to advertising (Mitchell et Olson, 1981). In fact, in most cases, a consumer is exposed simultaneously to several brands or several different advertising spots. In entrepreneurship, amidst the real conditions of elaborating a Business Model, one can estimate that a project leader fine-tuning his BM also has the choice of various methods, which he will find on the Internet or which his advisor will make available for him.

CONCLUSION

Starting from a need to teach and learn business models, our research has highlighted the interest of the mind map as a tool for learning and for creativity in the elaboration of a BM. In fact, our results showed that the mind map facilitates learning of the BM (an understanding of the theoretical model and its components, memorization of the model and easier reproduction of it). It stimulates creativity in the elaboration of a BM, all the more when deployed by a group and combined with other techniques. Creativity, framed by the GRP grid, does not lead to the overthrow of dominant paradigms, but it can serve to explore possibilities upstream of the entrepreneurial process. The fine-tuning of the initial idea and the search for business opportunities can be enriched, just as can the interconnections between different components. Through the physical representation of the BM on a support (paper or screen), finally, the mind map can be deployed in the oral communication of a BM.

The action-research that we set up in a pedagogical context has brought several contributions to light.

On a theoretical level, the importance of the link between creativity and BM was underlined. Still rarely evoked in the literature, this link is nevertheless a crucial one and it evokes at least two reflective possibilities: the BM is a source of creativity and creativity stimulates the conception of possible BMs (innovative or not). But the inherent creativity of the BM had not yet been framed by a scientific undertaking. We address the shortcoming here by adding an empirical research about the fine-tuning of the BM.

On a methodological level, the operational framework used has contributed to an improvement in BM teaching methods. The recourse to the mind map for teaching the BM proved to be an innovative teaching method for facilitating creative learning. The mind mapping technique is easy to teach and to understand. Numerous free editing software packages, without being obligatory, guarantee a quality production in aesthetic terms. Moreover, the interest of using the method lies as much, in our view, in its originality as in its ability to be applied and duplicated easily in other contexts.

On a managerial level, finally, the contributions previously cited open up the possibility for management students and their instructors, and also project leaders and their guides, to appropriate and concretely illustrate the BM concept, which is much discussed in the literature but rarely shown. Visualization is revealed as essential in our work. It is what facilitates the BM learning process. The protocol can be deployed with real project leaders to elaborate their BM in a visual and creative way.

The positive evaluation of the experimentation has certain limits, which each constitute a direction for further research. The responses can be tarnished by a positive bias, to the extent that the tools were proposed by the teacher leading the session. Although precautions were taken (the exercise was not graded and the questionnaires were auto-administered in writing, individually and anonymously), the experience would gain from being renewed and assessed in different contexts and with different publics, notably with project leaders working on their own cases of business creation.

The combination of the three tools presents a limit to the extent that it could be the source of bias that is hard to identify. A new experimentation, uniquely centered on the mind map, would enable the elimination of these



biases and would reinforce the interest of the mind map itself. It would, besides, be interesting to go further with the groups already initiated in mind mapping by experimenting with techniques likely, according to McFadzean (1998), to break with the dominant paradigm with a view to producing BM's that were more original.

A third limit relates to the very strong overlap between the visualization tool (mental map, business network map or 9-box chart) and the theoretical tool modeling the BM (in our case, the GRP model). Reading the feedback, it is sometimes troubling to observe the indivisible character of these two elements. When, for example, a student writes that he appreciates the mind map "for its organization", for its "logic", is he speaking about the tool or the GRP model that imposes this logic with its components and its structure? One of the participants, incidentally,

made a clean cut in favor of the model: "it wasn't the tools I preferred but the GRP which stops you from forgetting anything when you make a BM. The parts are well segmented." This remark could call for complementary research that aims to isolate the contribution of one particular tool or the GRP model, by comparing it for example with other models.

The "mind map-GRP model" combination seems to offer an efficient possibility for communicating the BM to other people. This statement merits assessment in the real situation of entrepreneurship, for it highlights the fundamentally partner-based nature of the BM. To this end, the conventionalist perspective of the BM alongside the theory of boundary objects evoked in discussion could provide a relevant theoretical framework.



Annex 1. Evaluation questionnaire

Table A1. Evaluation questionnaire: structure and objectives

Questions	Objectives
1. What did you appreciate about this session?	Understand the general feeling of participants and the points of satisfaction
2. What struck you as important in the session? Why?	Assess the session's contributions in terms of the learning process
3. What seemed most clear to you? Why?	
4. What seemed most useful to you? Why?	
5. You tried out 3 tools. Which tool did you prefer and why?	Rank the tools tested
6. Please give your view successively on each of these three tools:	Assess perception of each tool separately
- Business network map	
adjectives describing the tool:	
- GRP 9-box chart + PMI	
adjectives describing the tool:	
- GRP mind map	
adjectives describing the tool:	

Annex 2. Analysis of how the creativity session was perceived

The following table draws up, by decreasing order of occurrence, the list of benefits perceived by students for the creativity session as a whole. Representative reports illustrate each of the categories identified.

Table A2. Perceived contributions of the creativity session

Categories (number of occurrences	Examples of reports
Group work (36)	<i>"I liked the group work," "the team work", "the interaction with the teacher", "confront your ideas with other people's", "we helped each other with the ideas", "it was good to have the comments of the foreign students", "the accompanying explanations were useful".</i>
Understanding the GRP (32) including relationships between the components of the GRP (4)	"understanding the components and the links between them", "these elements had been quite theoretical in my head, now much less so", "understanding not just the GRP but also its purpose thanks to this session", "the categories of value architecture and value manufacturing are now clearer", "understanding the P part of the GRP", "conventions", "soaking up the GRP", "useful for understanding the links between the different parts of the BM", "different things in firms can be linked to one another".
Creativity (24) including freedom (5)	"find ideas that would not have come on their own", "develop aspects I had not realized", "innovative, enables us to go further than we had first thought, "starting from a case where nothing was given", "enables one to find new ideas", "group creativity is instructive", "free creation around a project", "freedom to think in our own way", "no limits set on creativity".
The different tools: - mind map (24) - business network (2) - 9-box chart (1)	"learning the mind-mapping technique particularly attracted me", "it simplifies the GRP", "understanding the GRP thanks to the visualization that the mind map provides", "the mind map is clear, fun, not many words", "the business network map extremely simple already gives a concise idea of the exchanges between a firm and its partners", "one could see where the strengths and weaknesses lay".

Categories (number of occurrences	Examples of reports
Overlap of the different stages (12)	"different stages that enable an understanding of the passage towards the BM", "the complementarity of the exercises", it all seemed useful to me: each stage partially prepares the next one", "overlapping the 3 workshops is a constructive approach that becomes intuitive as you move through the stages", "there is logic in the approach", "the map rolls out more easily than the two previous stages as it could encompass the network map within it and get back to the chart".
Link theory-practice (14) including working on a real case (7)	"the practice enables the assimilation of the theory", "understand the interest of the works, their practicality for business creation", "put in practice the theoretical notion of BM", "based on an example", "the practical case-study is a real case", "real problematics were mentioned that can confront an entrepreneur".
Visualization (11) including overall visualization (4)	"for once, you could see what you were dealing with", "obtain a non-literary vision of the GRP", "visible", "visual", "I could see things in an image rather than on a list", "I visualized the BM via the mind map with drawings, colors, texts", "broader vision", "overall view".
Active learning process (11)	"discover on our own", "I appreciated that it required thought", "it forced us to think", "it was more active and more dynamic than the other lessons", "personal reflection on the BM struck me as important".
Original class/original content (8)	<i>"unblocked", "it's different from what we usually do in class", "able to use new ways of making a BM", "a different approach to the BM", "discovery of new methods", "another kind of lesson".</i>
Final presentation (6)	"see the different ideas from the other teams", "comparing the maps from the different groups enables us to better assimilate the possibilities of interpreting the GRP".
Motivating (4)/Fun (3)	"it awoke my interest", "one doesn't notice the time passing", "we threw ourselves into this project", "fun", "amusing".
Easy learning process (5)	"really easy to use", "fluid", "we understand and remember it through writing".
The GRP model (5)	<i>"I appreciated the GRP model for summarizing a BM".</i>
Clear framework (4)	"clear and precise explanations", "the PowerPoint was very clear to understand".
Organization (2)	"organization of ideas"



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