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POLYTECHNIQUE MONTRÉAL

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Proposition and Test of an Interventional Program to Incentive Mutual Aid and Reinforce a Supportive Peer Network

SAMIRA NAMDARY MOGHDADAM

Département de mathématiques et de génie industriel

Mémoire présenté en vue de l'obtention du diplôme de *Maîtrise ès sciences appliquées*

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Ce mémoire intitulé :

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présenté par **Samira NAMDARY MOGHADAM**

en vue de l'obtention du diplôme de *Maîtrise ès sciences appliquées*

a été dûment accepté par le jury d'examen constitué de :

Nathalie DE MARCELLIS-WARIN, présidente
Samuel Jean BASSETTO, membre et directeur de recherche
Fabiano ARMELLINI, membre et codirecteur de recherche
Luciana PAULA REIS, membre

DEDICATION

To whom has the generosity to encourage positive actions and are eager to improve life.

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RÉSUMÉ

La participation des individus aux activités et aux initiatives d'amélioration est la principale source de la démarche d'amélioration continue, elle est considérée comme un levier de toute l'organisation. Impliquer les gens dans ces activités reste l'un des défis de l'amélioration continue pour les gestionnaires et les dirigeants des organisations qui adoptent cette approche. Bien que les responsables sachent très bien qu'ils devraient encourager la participation, sa mise en œuvre reste discutable. La carotte et le bâton ne peuvent pas favoriser la participation. En effet, les personnes engagées qui ont une attitude et une énergie positives à l'égard du progrès sont la source de créativité et de développement, l'organisation à donc le devoir de les soutenir car ils servent comme moteur d'amélioration et un exemple idéal pour les collaborateurs les moins impliqués. Il est toujours difficile d'engager une personne non impliquée dans des activités d'amélioration, mais il est possible de renforcer l'intention et la conviction des personnes qui ont tendance à participer à des activités d'amélioration en déployant les outils et les moyens nécessaires pour soutenir leurs comportements. Les membres du laboratoire CimarLab ne constituent pas l'exception à cette situation. Cette recherche appliquée dans le CimarLab a pour objectif de soutenir les actions créatives de l'individu et d'encourager son implication.

Le résultat de cette recherche est un programme d'amélioration interventionnelle qui peut servir comme un outil pour les membres de Cimarlab où le responsable applique la méthodologie d'amélioration continue S.T.A.R.S aux actions créatives des membres pour améliorer leur travail. La méthode utilisée dans notre étude, nommée RESSOURCEFUL, comprend deux parties principales, l'application de l'outil et son test : en tant que membre de Cimarlab, nous avons proposé dans un premier temps le prototype de RESOURCEFUL en appliquant la méthode de recherche participative aux utilisateurs qui sont supposés utiliser cet outil. Deuxièmement, nous avons testé l'efficacité du prototype lors de la première étape avec les utilisateurs principaux de l'outil.

Cette recherche rassemble l'hypothèse de la théorie cognitive, de l'action raisonnée et de la théorie des études comportementales planifiées pour comprendre la prémisse de la participation d'un individu. Ils définissent les conditions de l'environnement digne de confiance et favorable incitant les employés à participer à des activités d'amélioration. Compte tenu de ces hypothèses, RESOURCEFUL encouragerait la personne à demander de l'aide et diffuserait un comportement d'amélioration. Il fournit le mécanisme permettant d'échanger la reconnaissance des actions, la rétroaction

positive et le crédit-temps pour remercier les pairs de leur participation et de développer un réseau de pairs positif et fiable.

Nous avons appliqué le modèle CIAM pour étudier l'efficacité de l'outil dans la promotion de l'intention des individus. Ce modèle propose un outil basé sur des études comportementales pour évaluer la méthodologie de participation des employés. Enfin, RESOURCEFUL a été évalué avec un échantillon de 6 utilisateurs pour la première fois au sein de Cimarlab. Ils sont la source appropriée pour développer et améliorer l'outil dans notre recherche. Enfin, RESOURCEFUL a été évalué avec un échantillon de 6 utilisateurs pour la première fois au sein de Cimarlab. Leurs commentaires nous conduisent à des résultats fiables pour les travaux futurs, tout en améliorant le prototype.

Par conséquent, nous ne pouvons pas rejeter l'outil proposé pour renforcer l'action d'initiative des utilisateurs qui ont bien voulu participer car ils ont tous répondu qu'en utilisant RESOURCEFUL, ils agissaient de la manière qui les avait aidés à mieux se sentir. Les utilisatrices pensaient que leur efficacité personnelle, en tant que déterminants de l'intention d'un individu, était améliorée grâce à RESOURCEFUL. Entre-temps, lors de l'entretien mené par le chercheur, les principaux utilisateurs de RESOURCEFUL déterminent les difficultés, les avantages et les points d'amélioration. Ceux-ci peuvent envisager d'améliorer les performances de RESOURCEFUL.

ABSTRACT

Individual's participation in an initiative activity is the principal source of the continuous improvement approach and known as a constant effort of the entire organization. Engaging people in these activities is still one of the difficulties of continual improvement for managers and leader of an organization who practice this approach. Although the manager is very well aware that they should encourage involvement, how it can be performed is still arguable. The carrot and stick can not promote involvement. Indeed, engaged people who have a positive attitude and energy toward improvement are the source of creativity which should be supported by the organization and their social context. It may difficult to engage an inactive person in improvement activities, but it is possible to reinforce the individuals 'intention who eager to participate in improvement activities by fostering the supportive condition to encounter their exhausted psychological state. The members who work for CimarLab are not an exception from this situation. This research defined in the CimarLab to support the individual's creative actions and encourage their involvement.

The fruit of this research can be an interventional improvement program that can be used as a tool for the members of Cimarlab where manager practices the continuous improvement methodology of S.T.A.R.S for the members' creative actions to improve their work. We name it RESOURCEFUL. The method of Our study includes two main parts. First, as a member of Cimarlab, we attempt to suggest the prototype of RESOURCEFUL by applying the participatory research method with the users who are supposed to utilize this tool. Second, we test the effectiveness of the prototype at the first step with the primary users of the tool.

This research collects the assumption of the cognitive, theory of reasoned action and theory of planned behavioural studies to understand the premise of an individual's involvement. They define the condition of the trustworthy and supportive environment which encourage employee's intention to participate in improvement activities. Considering these assumptions, RESOURCEFUL would encourage the person to ask for help and spread improvement behaviour. It provides the mechanism of exchanging recognition of actions, positive feedback and Time-credit to gratitude the peers participation and developing the supportive and reliable network of peers.

We applied the CIAM model to investigate the effectiveness of the tool in encouraging the individuals' intention. This model proposes a tool based on behavioural studies to evaluate the employees' involvement methodology. Finally, RESOURCEFUL assessed with a sample of 6 users

for the first time within Cimarlab. They are the appropriate source for developing and improving the tool in our research. Their comments lead us to reliable findings for future work, meanwhile improve the prototype. Consequently, we can not reject the impact of the proposed tool on reinforcing the users' initiative action who willing to participate as they all replied that by using RESOURCEFUL they acted in the way helped them to feel better about their participation. The female users believed their self-efficiency, as the determinants of an individual's intention, improved by RESOURCEFUL. Meantime, during the interview conducted the primary users of RESOURCEFUL determine the difficulties, benefits and improvement points. These can consider improving the performance of RESOURCEFUL

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LIST OF SYMBOLS AND ABBREVIATIONS

This list presents the symbols and abbreviations used in this thesis in alphabetical order, along with their meanings:

CI Continuous Improvement

TPB Theory of planned behaviour

CIAM Continuous Improvement Acceptance Model

TRA Theory of Reason Action

LIST OF APPENDICES

CHAPTER 1 INTRODUCTION

Despite widespread agreement about potentials of employees' involvement, many organizations reported the difficulties in implementing and sustaining effective involvement of employees (Tang, Chen, & Wu, 2010). Nowadays, the lack of individuals' involvement in daily initiative activities is considerable and thought-provoking. According to Gallop's report, only 30% of employees are engaged in their job; it means they are emotionally invested in committing their time, talent and energy in adding value and advancing organization's initiatives. Means that the majority of U.S. workers (70%) are not reaching their full potential. The employee's engagement issue has remarkable consequence for the economy and the individual performance in US. The report announces 550$ billion dollar cost a year for employee's engagement problem (Gallop, 2017).

The researcher believes that individual creative actions relate to the positive psychological states of work engagement such as commitment, positive affect which offer positive energy to coordinate their knowledge and skills to engage in creative actions. Engaged people are likely to build a high level of enthusiasm for creative problem-solving. In contrast, when people experience burnout, they devote less energy for challenging cognitive tasks like creative thinking (Bouckenooghe & Menguç, 2018).

According to Amabile (1988) study, employees who have creative potential may or may not produce creative ideas because it is dependent on whether or not their surrounding social context offer them a supportive platform to exhibit their creativity. Forbes research claims that managers may fail to support the employees' involvement when they share their work problems and initiatives to improve their work. This research conducted a study of 27,048 executives, managers and employees discover that more than 50% of employees do not trust their managers because when they share work problems, he/she does not constantly respond to them. The consequence of ignoring feedback by managers decrease the employee's involvement and commitment (Murphy, 2018). We should pay attention that most managers are extremely busy. They are under pressure for results. Therefore, it is easy for them to let praise for creative efforts –not just creative success but unsuccessful efforts, too- fall by the wayside. For sometimes, people find their works exciting without praising and positive feedback. However, to sustain such intrinsic motivation and enthusiasm, the people must feel their actions are a matter for the organization and some important group of people (Amabile, 1998).

On the other hand, peers and friends' support to participate in creative work as another component of a source of social contexts can impact on the individuals' involvement in creative work. Lindquist study explains the influence of a person who has experienced the previous initiatives, on others. He states that the persons who had a change willing but was not supported by managers may express their feeling and may influence others to release improvement actions(Lindquist, 2011). Consequently, as studies show the employees' creativity is the result of the social process in which others in the environment stimulate and support initiative actions (Perry-Smith & Shalley, 2003). Behavioural researchers studied found that trustworthy peers' relationships and supportive work climate can encourage individuals' involvement in improvement actions. They determined the factors for such a supportive environment for employees' involvement, which can satisfy their expectation to free up the initiative actions (Tang et al., 2010).

According to Pentland (2010) study when people encounter a new problem, they need to shape peer groups that are relevant to the issue. They tend to form cohesive peer-groups that allow commenting on the shared ideas and attitude through the face to face contact that does not find with internet or phone call. There is substantial evidence that people involved with such peer groups are not just more productive and creative. Further, they are also happier, more resilient and more satisfactory. They can create a contagious positive mood, fostering trust and encouraging more socially informed participation.

Our attempt in this study is to sustain an individual's positive energy who intended to act in improvement activities. Thus, the crucial challenge is how the organization can develop a peer, trustworthy and supportive network for the improvement initiative of these people?

In this research, we aim to propose an interventional program base on seeking the help of others and then encouraging their participation extrinsically and intrinsically. The premise of this research is that the recommended tool helps to reinforce the trustworthy peer- network, which is crucial as an instrumental in shaping involvement in creative work. This research conducted to accomplish such a purpose for the members who work in Cimarlab community in Polytechnic de Montreal in Quebec province.

We apply the participatory qualitative research method to reach the objective of the research. The researcher, as a member of Cimarlab, has an opportunity to connect with the peers to develop the

idea. This bottom-up research approach allows the researcher, realize the facts about the actual people who are the final users of the proposed tool.

This thesis consists of four chapters to answer the research question. Forasmuch as the term of continuous improvement applies to the employees' involvement, in the second chapter, we conduct the brief literature review about continuous improvement and employees' creative involvement which attempts to improve the quality. Then we explain the behavioural studies to determining the condition for employees' participation and finally, we explain the extrinsic and intrinsic motivation mechanism which apply as a pillar of the proposed method. In the third chapter, we describe the research methodology to develop an idea, questions, description of the case study which this research conducted for it and data collection in more details. Chapter four illustrates the prototype of the tool and the result of evaluating the tool. Finally, the last section provides a conclusion for readers.

CHAPTER 2 LITERATURE REVIEW

In order to answer the research question and propose the tool, our literature review divided into three main sections. In the beginning, we describe the continuous improvement approach and the major concepts. In the second section, we introduce the behavioural studies with the focus on continuous behaviour actions. The behaviour theories explain the conditions and the factor that can be effected on continuous improvement action. Finally, in the last section, we will talk about alternatives that can be rewarded the improvement action.

2.1 Action of continuous improvement

By the early of 1900, much attention is given to the scientific management theory. Scientific methods developed to analyze and solve production for managers. Managers applied the control timing to various elements of tasks for improving the way to complete that task. This paradigm is base on standardization, a division of labours, control and mass production. This type of management theory distinguishes between the thinking labour forces, and those that execute therefore this segregation does not allow the organization to fully discover all the occasions to increase productive efficiency (Baghel et al., 2005).

During the Second World War, the US government then set up the “Training Within Industry” service to enhance the industrial output on a national scale. These programs emphasized daily improvement through large numbers of small front-line improvement ideas (Robinson & Schroeder, 2009).

Several studies in 1990 found that successful CI should be driven and managed strategically and aligned with long-term and clearly defined organizational targets. Proper infrastructure and toolkit can convert the CI program to company-wide process. Therefore, constant change and employee’s involvement should be embedded in the organizational culture (Yen-Tsang, Csillag, & Siegler, 2012). Until the mid-1990s main CI studies focused on its procedures and toolkit factor especially those related to quality management, during the second half of the 1990s, researchers became more concerned with the managerial and behavioural aspects of CI.

2.1.1 Continuous improvement theory

Imai developed kaizen philosophy in 1980. Kaizen means “change for better.” It refers to CI in western countries. In general, continuous improvement is defined base on three main principles:

The first principle implies thinking about processes inside the organization with emphasizing on the improvement of machinery and equipment to satisfy customer needs and stay competitive in the market.

The second principle relates to finding a way to measure the performance of the processes to detect the improvement area. Because of this, continuous improvement incorporates statistical concept and tools for problem-solving. Such as PDCA (plan-do-check-act) developed by Deming, DMAC, Six Sigma. These methods provide rapid action to meet the needs of the consumer and a long-term phase to address the underlying causes. This approach often involves temporary teams of employees for a particular problem or theme defined by management (Singh & Singh, 2015).

Finally, the third important aspect of continuous improvement is people-focused. The primary focus is to improve one’s work on the spot of work methods, process and the use of the resources through the idea of employees. for this purpose organization should reintroduce the operational workers into “thinking” process (Baghel & Bhuiyan, 2005).

2.1.2 Innovation and continuous improvement

The deviation from the desired state or seizing opportunities for improvement through creative thinking can trigger the initiatives for CI. The improvements are reached by developing new technology and equipment, which require investment or by the incremental improvement by involving individuals that raises the standards in organizations. Generally, Continuous improvement has a belief that all individuals can contribute to problem-solving innovation within the firm and improving the production and service by their involvement. The extended period with incremental improvement can result in a significant initiative (Lodgaard, Ingvaldsen, Aschehoug, & Gamme, 2016).

The organization can achieve a continual stream of innovation by mobilizing the high proportion of the workforce in the process of problem-solving (Bessant, Caffyn, & Gallagher, 2001a). Therefore, supporting the most precious asset which is people and their involvement inside the organization and sharing the strong beliefs that he/she has the potential to create an idea are essential for

an organization to achieve the level of profitability, quality, and productivity (Yen-Tsang et al., 2012).

However, sustainable CI process by achieving people participation continuously is "easier said than done," but it is the principal factor in ensuring the CI system to succeed (Pun, Chin, & Gill, 2001). Research reports that 70% of attempted organizational change is not sustained. Various reasons decrease the chance of success. Lack of employees involved is one of the main reasons which is highlighted by the author, among other reasons (Donnelly, 2017).

2.1.3 Individual involvement in continuous improvement

For going forward in this research, we need to clarify the meaning of "an engaged people" and "involved people" and how they related to each other. An engaged individual is a person who willing to exert high effort for the organizations and accepts the aims and objective of the organization. This person has an enthusiastic attitude, feeling motivated and energized toward performing their work and always asking "how am I going to improve my job."

In the next step, an organization should strive forward involves the individual in decision-making. An involved person is whom to act for the new initiatives and actively participate in driving change. "Engagement is about creating opportunities for employees to connect with their colleagues, managers and the wider organization. It is also about creating an environment where employees are motivated to connect with their work and care about doing a good job"[1] (Gatenby, Rees, Soane, & Bailey, 2008). Therefore, an organization must create the condition and environment to permit individual pursuit their passive energy to an active one.

Bessant argues that an employee's involvement in continuous improvement can build through the bundle behavioural changes. These changes need to be established in the enterprise to constitute particular abilities, for example, systematically find and solve the problems or share knowledge. However, this process implied a long and challenging journey, involving the articulation and learning (usually by practising) of behaviours and reinforcing them until they become a habit (Bessant et al., 2001b).

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1 Definition of: Chartered Institute of Personnel and Development(CIPD).

2.1.4 Organizational learning infrastructure for individual involvement

According to Galeazzo, the infrastructure can promote employees' involvement and sustained continuous improvement. Their studies explained strategical alignment, goal management and teamwork as dimensions of organizational infrastructure (Galeazzo et al., 2017).In the following paragraph, we explain these dimensions:

Strategical alignment: Cross-functional integration can align organization strategy by allowing employees to understand each other's objective, encourage coordination and collaborations that pursue the same objective (Turkulainen et al., 2012). Consequently, it focuses on resources and competencies on problem-solving and enhances the ability of a firm to improve its products and processes continuously (Galeazzo et al., 2017).

Teamwork for problem-solving: A team-based infrastructure enables horizontal collaboration and enhances knowledge flow (Hosnavi et al., 2011) and support continuous improvement. Employees cultivate social relationships, exchange information and promote involvement by forming teams. Through the team, members trust each other and feel free to talk, openly discuss their errors and ask for help. Teams enable people to create a common language, foster mutual understanding and improve organizational climate to engage employees in improvement initiatives and learning behaviour. (Choo et al., 2007). The empirical study of Galeazzo finds that teamwork for problem-solving build on creating interdependence, informal coordination and involve the organization members to foster collective behaviours. That is conducive to implementing continuous improvement initiatives in the organization, thus triggering a constant improvement to change for the better (Galeazzo et al., 2017).

Goal management system: as continuous improvement affects firm performance, goals management system can provide incentive employees to be involved in systematic improvements to reach organizational objectives (Peng et al., 2008). It is also essential that the goal management system be fair. In inappropriate rewarding systems, maintaining collaboration is difficult because employees do not trust each other and do not collectively participate in targeting organizational goals (Kirkman, Jones, & Shapiro, 2000). Conversely, employees may avoid being proactive in discretionary goals management systems (Olkkonen & Lipponen, 2006). Finally, the firm with a fairly implemented goals management system is more likely able to adjusting employees activities and increase commitment and proactive behaviours that support CI (Galeazzo et al., 2017). The author

suggests that extrinsic motivation is not sufficient to promote learning behaviour and enhance individual engagement; intrinsic motivators should be considered to engage employees in the continuous improvement process.

2.1.5 Employee's involvement methods in daily improvement activities.

According to Robinson and Schroeder, the performance of improvement initiative systems integrates into daily operations with dynamic employees' participation in generating the initiatives opportunities. They believe regular meeting in all level of organization for supporting ideas, is a factor that makes continuous improvement approach sustainable and integrates it into the corporate culture (Robinson & Schroeder, 2009).

The STARS propose a methodology for continuous improvement and allow staff to move from spectators to improvers. Recently S.T.A.R.S as a problem-solving method proposes to front-line participation in their daily work improvement. Each letter refers to the certain step. This method applies 5 steps (5 étoiles) consisting:

1) **S**tore: The employee describes the observation and improvement opportunity.

2) **T**ag: In this step, the person who stored the opportunity become connect to his/her colleagues to build the improvement team.

3) **A**nalysis: Refers to identify the probable causes of the situation.

4) **R**esolve: Suggests possible solutions to answer each cause to describe appropriate action (date and plan).

5) **S**ustain: Identifies means of control or measures to prevent the situation from repeating itself. By using this method, front-line workers organize around a problem-solving process in daily works and also must be supported by their managers (Restrepo, Charron-Latour, Pourmonet, & Bassetto, 2016).

2.2 A look at the involvement of employees in CI actions from behavioural theories.

The primary objective of this part is to identify essentials that are relevant for encouraging individual's intention involvement in CI activities. In further we describe the social cognitive theory, the

theory of reasoned action (TRA), the theory of planned behaviours (TPB), its incorporate studies to explain people's behavioural intentions toward CI activities.

2.2.1 Social cognitive theory for CI behaviour:

According to Bandura, people are neither autonomous agents nor mechanical conveyors of animating environmental factors. Individuals regulate their decision to choose the possible behavioural options available for them via the information received from three factors, which are personal characteristic, environmental and behaviour (Bandura, 1999). Based on Bandura theory, the two central scopes of self-regulatory are self-efficiency and income expectancies. Self-efficiency which is the individual trust to possesses the ability, skills, resourcefulness, and ingenuity to achieve a certain level of performance. So, this personal characteristic is one part of his/her cognitive process in which individually decide whether or not to take specific action. The desirability of the outcome, which can increase personal confidence to execute the desired action determines the motivation of selecting the behaviour (Bandura, 1999).

According to Shea and Howell, the cooperative and trustworthy climate is one of the keystones of implementing continuous improvement behaviour. This environment condition enhances employee involvement through the reinforcing of individual self-efficiency. One of the variables that influence individual self-efficiency is a leader's behaviours modelled. Leaders of organization with the mindset of improvement and have a moral of taking risk and self-scarifies to achieve goals are expected to display a transformational leadership behaviour with communicating and encouraging employees to try new ideas and rethink approaches to the problem from many angles. Such leaders enhance flowers' self-efficiency by increasing their confidence that they can execute the required behaviour and their outcome expectancy (Shea & Howell, 1998).

2.2.2 Introduction of Theory of reason action (TRA) for CI behaviour

Ajzen and Fishbein formulated in 1975 the theory of reasoned action (TRA). This TRA assumes that individuals are rational and make systematic use of available information to develop a behavioural intention to do something. TRA suggests an individual's intention is the best predictor to perform the behaviour. This model presents the individual's intention as a function of his/her attitude toward the behaviour and his/her subjective norm. Attitudes referred to an individual positive or negative evaluation of appropriate behaviour and regarded the perceived outcomes of

performing the behaviour. TRA recognizes that there are factors that limit the influence of attitude on behaviour. This limit refers to the availability of resources such as time or money. The second element to predict behavioural intent is subjective norms. Subjective norms are everything around individual, such as his/her social networks or social pressure. These refer to expectations of other people whether others support or discourage his/her performing of a given behaviour (Fishbein & Ajzen, 2011)

The TRA model was applied to investigate behavioural aspects required to enhance continuous improvement culture and link employee's participation in CI sustainability. According to YenTsang, the CI scheme should create an environment that motivates communication, experimentation, dialogue and inquiry and stimulate creativity to encourage employee's improvement initiatives. They claim that sustainable CI should first be defined as a set of routines since routines and process are the way people do things in a company, they can be assumed to be a kind of operational behaviour which reflects human belief and attitudes (Yen-Tsang et al., 2012).

2.2.3 Introduction of Theory of planned behaviour (TPB) for CI behaviour

TPB comes from an extension of TRA. According to TPB, intention is function of three factors, attitudes, subjective norms and perceived behavioural control. The attitude and subject norm is described in last previous section (TRA), and The perceived behaviour control refers to an individual's evaluation of the difficulty or easy associated with performing the target behaviour. As figure 2-1 illustrate the role of this theory, the more desirable the attitudes toward performing a behaviour, the higher the perceived social approval, and the greater perceived control, the stranger intention will be and therefore, the greater likelihood of achieving the behaviour in question. (Ajzen, 2011)

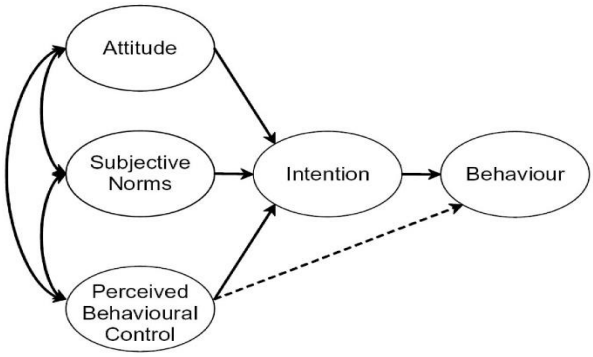


Figure 2.1 Theory of Planned Behaviour model, taken from (Ajzen 1991)

Dawkins et al. (2005) using the Theory of Planned Behaviour (TPB) to create a framework for integrating significant factors influence individual decision to participate in the programs which require the employee's involvement. They explain the impact of a supportive environment and trustful relation on the individual's decisions. Regarding Dawkins employees, involvement programmes cannot be seen distinctly from the social context of the work's place. By applying TPB theory, their finding highlights the role of a social factor and the individual's support network in their decision-making processes. Meaning that in the dynamic environment, the rational decision makers are likely looking for decision-making heuristics, like the support of others they respect. The findings of this study claim the role of leaders as other opinion makers that influence an individual's attitude and belief toward the action in the decision-making process. Regarding Dawkins, this leader may be a person inside or t outside of the organization. Moreover, the supportive environment should create a trustful relation between workers and managers. The perceived trust increases the likelihood of a behaviour. (Dawkins et al., 2005)

The study of Tang in 2010 is of particular interest because of its investigation on the individual-level determinants to enhance employee's involvement in CI activities. They consider employees' involvement in CI activities as volunteer activities and one kind of extra work. According to this study, employee's involvement in CI, activities is continuously identifying, analyzing, proposing, and implementing a solution to problem interfering with their work process (Tang et al., 2010).

Tang focuses on individual-level determinants of employee's involvement. The determinants help to managers to know how they can encourage employees' participation. They apply TPB. The findings of this study support that:

1) Self-efficient, as a component of perceived behavioural control is an important predictor of behavioural intention and employee's involvement (Tang et al., 2010).
2) The outcomes associated with participation in CI activities have an indirect impact, through their effect on the attitude of a person toward involving and on the intention to involve (Tang et al., 2010).
3) Since employees' involvement in CI activities is one kind of extra work, they may not want to participate in this kind of activities if they perceive there is a risk of the consequences that may occur by acting (Tang et al., 2010). So managers should drive out the fear of involvement and creating an environment to encourage the individual' intention to participate. By this way, the individual with self-confidence in their capabilities, as a perceived

behaviour control, may consider challenges to be mastered rather than as a threat to be avoided. This element is in the perceived behavioural control category (Tang et al., 2010).

Recently, Jurburg in 2017 conducted a study based on Tang (TPB) and the social cognitive theory. This study set up critical elements that are relevant for boosting employees' intention to participate in the CI activities by following a three-round Delphi study with 21 Spanish experts ranging from academics to practitioners. The main result of this study provides an initial set of different organizational and individual-level factors that drive employee's intention to participate. These factors were structured the Continuous Improvement Acceptance Model (CIAM). They provide the questionnaire based on the specified factors that help managers and researchers to assess their CI methodology. They claim that considering these factors in the CI methodology may solve the problem of employee's participation (Jurburg et al., 2017). Table 2.1 detailed some relevant factors and their definitions. Our research will apply part of their questionnaire to evaluate our proposed methodology for encouraging an individual in improvement activities.

Table 2.1 list of the factors from Jurburg et al., 2017

#	Factors	Definition	Element
1	Rewards	This factor addresses the expectations that people have about the results achieved within the CI system, and how they consider, in the case they exist, that the different reward systems set by the organization (economic and non-economic) could motivate employees' intention to participate in future CI activities.	Attractiveness Effort efficacy Fair rewards Motivation
2	Internal communication	This factor searches for the existence of good vertical (top-down, bottom-up) and lateral (employee-employee) communication of CI-related information, and not so much about what specific tools are used for that.	Involvement Information Knowledge sharing Channels
3	Self-efficacy	This factor reflects each worker's self-confidence level in terms of participating in CI activities, based on a self-assessment of his/her capabilities.	Autonomy Assistance Documentation Time availability
4	Social influence	This factor reflects the potential positive or negative social impacts that workers receive from closely related people (family, friends, co-workers, bosses, etc.)	Supervisor Co-worker Coaches Environment

2.3 The reward for involving individual

As the argument of the behavioural study shows, reward and outcome expectation will affect users' decisions on whether to participate in CI activities and the amount of effort they are willing to make. In this section, we will explain the information about the different form of rewards and motivation and explain a mechanism for our research.

2.3.1 Extrinsic and intrinsic reward

There are two types of motivation, extrinsic and intrinsic. The extrinsic reward comes from outside a person, and it could be a carrot or a stick. Extrinsic reward expects in financial such as money and non-monetary rewards. Money is the most common extrinsic motivator applied by managers. Nowadays, researchers believe that a cash reward cannot prompt people to find their work exciting and make employees passionate about their jobs (Amabile, 1998).

Rupturing relationship is one of the consequences of inefficient rewards system. In an organization that implement the limited rewards, force employees to compete for rewards and then ranking the winner through the use of memos, newsletters are the way may destroy relationship among employees and cooperation. “They will likely begin to see each other as an obstacle” (Kohn, 1993).

Based on the literature review, we describe two rewards mechanism that may foster a social relationship, which is the recognition of actions and Time-Credit.

1) **Recognition:**

In some companies, people often motivate by interaction with people who push each other to perform the action. They may stimulate by having a chance to help colleges or the person of the outside company. “Appreciation and recognition are the kinds of rewards that strengthen social relationship” (Maccoby, 2010). It is worth to focus on recognizing people as Maccoby belief. He cited that recognition of employees' effort is a reel need to speed of creativity and has an impact on the attractive workplace and create a supportive relationship (Maccoby, 2010, p. 4).

It is possible to find some recognition of software strategies such as Tap My Back[2]. It is an employee feedback app that provides a peer to peer recognition software. In this software, the designers help companies work on employee's recognition while improving engagement. Anyone within an organization can recognize another person based on organization values. It is possible to inspire this mechanism to create a supportive climate for employee's involvement in creative improvement activities. Josh Bersin presented the impact of implementing this strategy with a real case of JetBlue in the article published by Deloitte. He claims that the employee's satisfaction grew by 88% (Bersin, 2015).

2) Time-Credit

Providing services and aids confirm one's ability to contribute something valuable. Simultaneously, it offers an opportunity to learn from working with and helping others. According to Cahn, Time-Credit as a complementary currency can weave the social relationship in such a co-production system. He claims that Time-Credit may reward the co-operative and kind side of people in the volunteer activities and support people to take more active roles in their communities. Time-Credit is an innovative form of time banking that acts as a tool of enabling people to trade their time and skill with time currency. One Time-Credit acts as a thank you for the contribution of time (Cahn, 2000).

Time banks are a community-based organization that provides the framework for giving and receiving services in exchange for Time-Credits. Members earn Time-Credit by participating in group events or by working on the community-building project. Time-Credit will support one who takes part in the community. When one member provides a service to another member, they record that exchange. The number of time credits (minus) in the service recipient's account then transfer (add) to the service provider's account (Cahn et al., 2015).

We can find several time-banks around the world where the members exchange the service with the use of a unit of time as a currency and practice this logic. There are 307 active and registered time banks and have almost tripled in number over the last four years from 109 in 2008 to 307 in

2 https://www.tapmyback.com/recognize-someone-work/

2013 in the UK. The report of UK Timebanking in 2014 shows the exchange of 228,3989 hours with 29,926 members. Time banks operate in countries like America, Canada, Greece, Holland, Italy, Japan, Finland, Australia, New Zealand and Spain ((Wilson, 2015).

Time banks work toward building strong social networks and more coherence communities. Time bank offers rich insights that everyone's work has equal value through the creation of an environment of reciprocity. So underlying basic logic in time banking is base on reciprocity and equality. Reciprocate refers to the when a member receives an hour of service, there may be a moral or social responsibility to pay it back, but there is no obligation to do so (Markkanen et al., 2016). Equality means all hours are equal in value, regardless of whether a member provides a highly skilled professional service or simple service. One hour helping another member of the network equals one-hour Time-Dollar (or Time-credit), which can be used to buy an hour of someone else's time (Cahn, 2000).

According to Cahn, this system is capable enough to mobilize the resources to fill out unmet needs. Each transaction builds a relationship, and such relationships create a spirit of trust that allows people to reweave the fabric of the community. Earning Time-Credit embodies a kind of purchase power, and it conveys a sense that one's work has value. The first one is the extrinsic reward, and the second is an intrinsic reward. Time banking allows each person to progress in generating an improvement action for their community (Cahn et al., 2015)

In 2016, Cambridge Center for Housing and Planning Research conducted a reliable qualitative study with the Cambridgeshire Country Council Community Engagement Team, Spice and the Cambridge Institute of Public Health to evaluate the outcome of Time-Credit in five participated organizations. Their study was more focused on volunteering. Their results are helpful for our purpose as individual participation in CI activities has been known as a volunteering activity in the organization (Tang et al., 2010). This research presents the findings in individual, organizations level. According to findings, in the individual level, the "opportunities of feel needed and capable of making a positive contribution" is one of the outcomes of earning and spending Time-Credits. Also, they find evidence that earning and spending Time-Credit has helped to who has a belief in volunteering but had problems of isolate, low self-esteem and self-confidence. So There is a possibility that Time Credit derive individual and activate their potential energy (Burgess et al., 2016)

At the organization level, the case studies show that use of Time-Credits has helped organizations to attract and retain volunteers, including people who are not interested in participating. Time Credit given to volunteers enable the organizations to develop a more reciprocate relationship with others. Using Time-Credit, in some case, has assisted in engaging a more diverse community (Burgess et al., 2016).

The ACCORDERIE is a community in Quebec that established in June 2002. They create networks for exchange services through Time-Credit concept. ACCORDERIE has over 3,000 members over 45,000 exchange, for a total of 100,000 hours of service exchange by members in 2015. In this network, the members credited with 15 hours in their time account, which is like a bank account with the balance calculated in hours (L'accorderie, 2018).

CHAPTER 3 METHODOLOGY

In this chapter, first we formulates the research questions; the third section describes the case study; the fourth section explains the research strategy to propose an interventional program, and the fifth section explains the methods for collecting and analyzing the data to evaluate the idea.

3.1 Research question

The principal objective of our research is to maintain individual's improvement behaviours and boost a trustworthy peers network for their improvement action in Cimarlab.

The research questions of our study are investigating:

1) To evaluate how RESOURCEFUL can be helpful for maintaining an individual's involvement who is willing to act in improvement initiatives in Cimarlab.
2) whether RESOURCEFUL as an interventional program based on mutual help and rewarding the actions can reinforce an individual's intention in improvement activities and enhance the supportive peer network.

3.2 Case study

This research carried out in Cimar-Lab with 25 people who are masters and Ph.D. students. It is a French-speaking scientific laboratory located in Polytechnique Montreal. The students work on different topics such as the creation of methods and tools to solve real problems in the continuous improvement approach to improve the quality of life. CimarLab administration follows the organic organizational structure with decentralized decision-making and the standard operating processes support employees to accomplish their task. Moreover, Manager welcomes employees' actions to improve their work, and the members have been authorized to improve their work through their initiative action. Cimarlab practice the five-step S.T.A.R.S method (5 étoiles) in the day-to-day process to accomplish improvement action. This methodology allows members to record the improvement opportunities and analyze the problem to find the solution. A member should select the collaborator to act. The improvement opportunities and the ideas will be discussed during the weekly meeting within other members and manager. Finally, the manager and other members in the meeting encourage the taken actions and the solution. Therefore, it can be considered as a motivation process for member's participation in improvement activities. Despite the specifications

described in CimarLab, enhancing members' participation remain a challenge for the members of Cimarlab and managers. Since an individual's involvement is a bottom-up process, the manager support the researcher, as one of the members of the laboratory, to work with her colleagues. In September 2017, this study designed in Cimarlab and gave a chance to the author to propose the interventional tool to developing a supportive peer network for members' improvement actions.

3.3 Research strategy

We apply a qualitative approach to this research. The qualitative procedures provide a means of accessing unquantifiable facts about the actual people researcher observe and talk (Berg, 2001). Participatory research is a type of qualitative approach. In this strategy, people participate in research activities that impact on them and shorter the communicative distance between research activities and real-world activities (Foth et al., 2006). Involving people who have different background, experience, interests and role-such as researcher, workers and managers- within the research project helps to improve the usability of the tools (Sanders et al., 2010). According to Øvretveit, user-focused research is a way of improving the interventional program to meet the decision maker's needs and questions (Øvretveit, 2002).

In this research, being a member of Cimarlab encourage the researcher to applies the participatory method to work with the members who are the final users. The researcher has an opportunity to connect with users to develop the idea and want to understand their needs and opinions about the proposed program for their actions. The research methodology is designed in five phases. Figure 3-1 shows the five phases of research methodology.

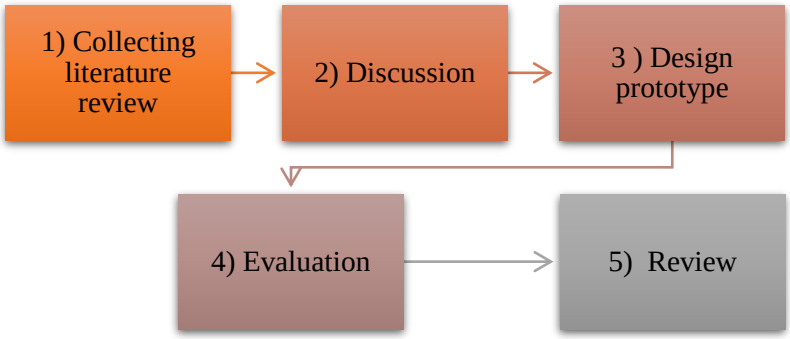


Figure 3.1 Research steps

At the first step, the researcher collected the literature review, which is discussed in chapter 2.

In the second step, we set up a meeting in Cimarlab and invited the members and manager to participate in seeking the appropriate actions. The researcher described the purpose of the study and we discussed some reward options for establishing the prototype of the idea. Figure 3-2 shows the picture of the meeting in February 2019.

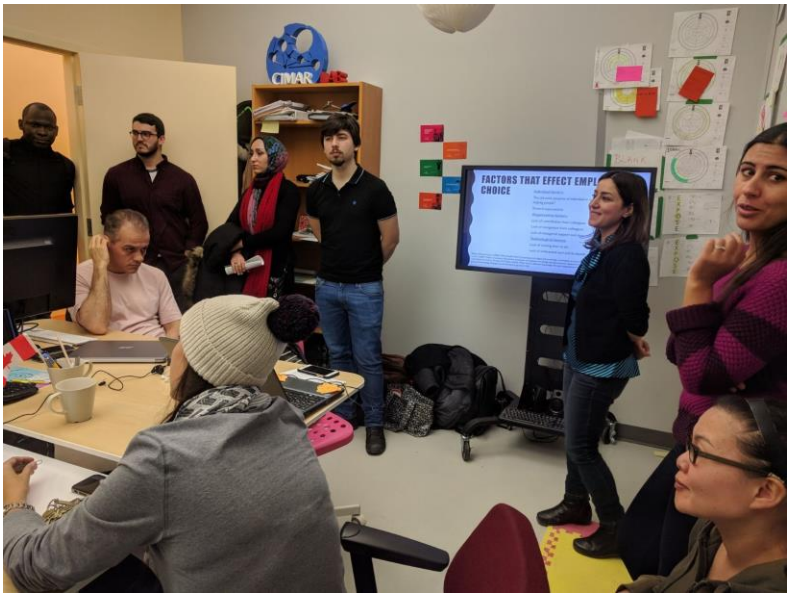


Figure 3.2 Meeting on February 2019

At the third phase, we designed the prototype as an interventional program while considering the findings of the literature review and actions research from members of Cimarlab. This phase included the meeting with the manager to discuss the expectations, defining criteria applied in the proposed tool and improve the general idea. Moreover, in October 2018 a meeting was set with Time-Banking expert in “Réseau Accorderie” to improve the design. Figure 3-3 shows the steps for each phase.

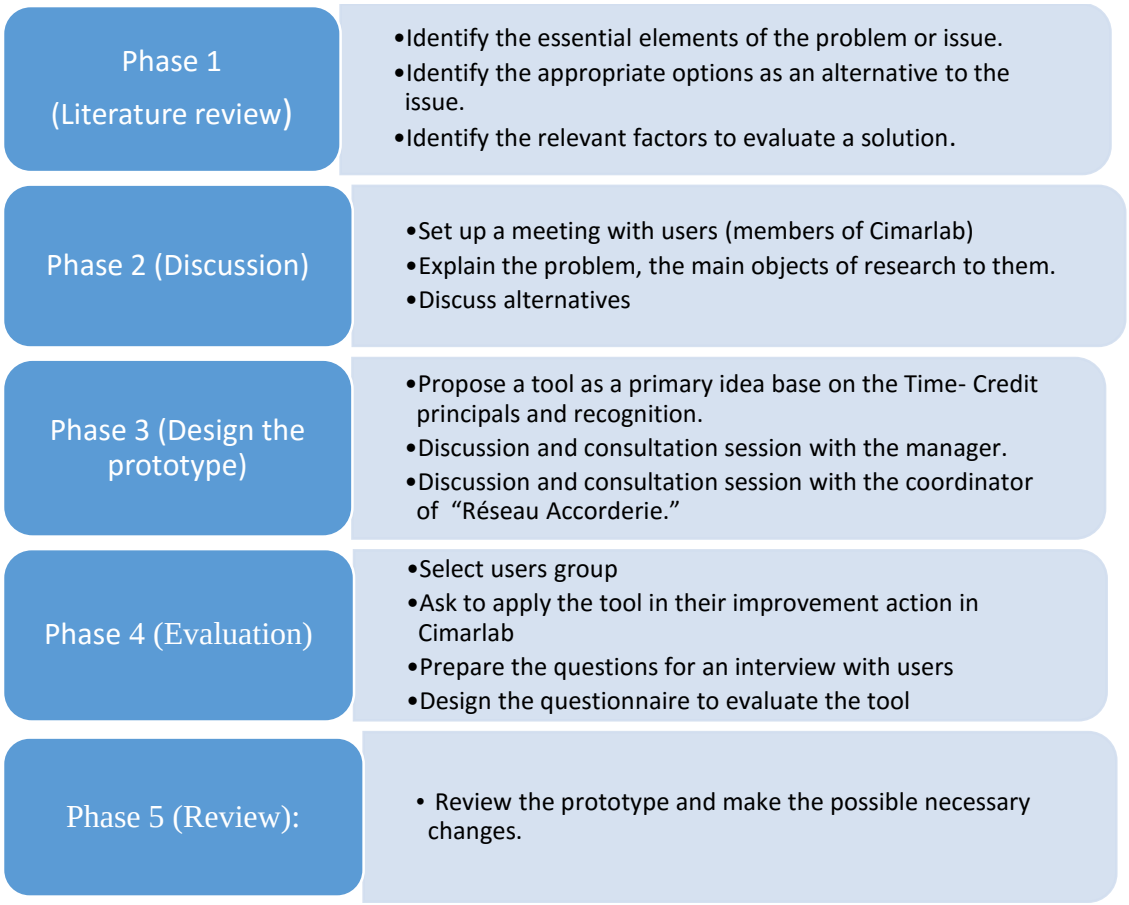


Figure 3.3 Research activities for each phase

The Fourth step designed to have more interaction with the users to search the appropriate actions about improving the prototype. The users group contained four members (colleagues, friends) received a prototype. We asked them to use the tool and give their comments. One month later, users became six-person, and we invited them to participate in the evaluation of the tool. All the users had willing to participate. In the evaluation step investigation about the effectivity of the prototype and how the intervention tool can be helpful for the users are the main two objects. The following section explains more detail about data collection methodology and how we evaluate the prototype. Finally, in the fifth phase, some modifications performed on the prototype base on users' discussion. In chapter four, We describe the output of the research methodolog, which is a version of the prototype and the results of the evaluation phase.

3.4 Data collecting

We apply the triangulation method by involving more than one method to gather data. The principal methods for collecting data are a survey and a semi-structured interview in the evaluation phase. According to Berg 2001,The combination of methods used for data collection helps the researcher to obtain the output from informal and formal instrument to explain different aspects an issue, or it may highlight unexpected findings. So we use semi-structured interview to communicate with user and listen to their points. It can help us to point out the weakness and strengths of the prototype and understand the users need to improve the tool for users. Then we use the survey base on literature review to evaluate the effectiveness of prototype.

The researcher developed the six open-end questions in the interview guide to ask the users perception, opinion about the prototype of RESOURCEFUL presented in Appendix B. The primary objective of performing an interview with users was to investigate the usability of the tool, discovering the improvement actions and the other findings that could not accomplish throughout the survey. The face to face interview carried out for the user's discussion. During the research tasks study, the researcher provides a regular conversation with the intended users to bring appropriate feedback. The researcher recorded the interviews for collecting data during the meeting.

As we explained in the literature review, CIAM model collected the factors that effect improvement behaviour from behavioural and cognitive theories to evaluate the CI methodology (Jurburg et al., 2017). We adapted the four factors from the CIAM model questionnaire at the individual and organizational level to verify whether RESOURCEFUL as an interventional program for CI can help to improve individuals intention to participate in improvement activities. With this survey, we investigate the responses of the users about the determined factors to understand whether RESOURCEFUL may meet the user's expectations for reinforcing the user's intention. The author in CIAM recommends that all items are measured using a 5-point Likert-scale, one refers to the “totally disagree,” and five present “totally agree” with the given statement. The questionnaire is applied to investigate the effectiveness of RESOURCEFUL from the perspective of users, in our case were six members of Cimarlab. The validity of this questionnaire was carried out by the study of Viles to assure appropriate psychometric properties (Viles et al., 2015).

Finally, we adapted the survey of CIAM. The survey contains 12 questions grouped into four factors (Reward, internal communication, Self-efficacy, Social influence), as independent variables. The last question refers to the user's behavioural intention to participate in improvement activities as a dependent variable . Also, some characterization variables are included in the first part of the survey, such as age and gender. Appendix A presents the questionnaire. Table 3.5 illustrate the definition of independent factors, the elements of each factor and the definition of a dependent factor, which is user behavioural intentions.

Table 3.1 Description of CIAM factors and elements

Factors	Definition	Elements
Reward	This factor considers the users' outcome expectations within RESOURCEFUL. The reward considered by RESOURCEFUL could motivate users' intention to participate in improvement activities.	Attractiveness Effort efficacy
Internal communication	This factor seeks for the existence of good lateral communication (peer to peer) of improvement-related information.	Involvement Knowledge sharing
Self-efficacy	This factor reflects each users self-confidence level in terms of participation in improvement activities based on a self-assessment of his/her abilities while using the RESOURCEFUL.	Autonomy Assistance
Social influence	This factor reflects the potential positive or negative social impact that users receive from related people while using RESOURCEFUL.	Co-worker Friends and environment
Behavioural intention	The employees express their subjective opinion of whether they are willing to participate in the different improvement activities that encouraged by the RESOURCEFUL.	

We use the quality-quantity analysis. To analyze the collected data from interviews, the researcher listens carefully to the transcripts, note and summarize the critical points that participants mentioned in their replies. The Excel is used to categorize and define the themes for each reply. Then codes and concepts with the same characteristics grouped under a category and abstract the content (Berg, 2001). The statistical method was performed to analyze the response of questions. We apply SPSS to analyze the data.

CHAPTER 4 RESULTS AND DISCUSSION

As mentioned in the introduction, the principal aim of this study is to propose an interventional program as a supportive tool for individuals' improvement actions who intend to participate. RESOURCEFUL is the proposition of our research, which is a tool with a collection of organized instruction in the format of cards to stimulate the improvement actions in a predetermined manner. It provides instructions to create a supportive and trustworthy peer network and attempt to reinforce the individual's intention by rewarding their behaviour. To achieve the research objective, the first section of in this chapter describes the RESOURCEFUL as an interventional improvement program proposed for our research question; second part reports the key findings from the research conducted in Cimarlab to assess the effectivity of RESOURCEFUL as an interventional improvement program proposed for our research question. The first section describes the qualitative data gathered by interview and the second section provides a quantitative result and statistically analyze. Finally, the last section will provide a discussion.

4.1 The proposition of RESOURCEFUL as an interventional program

RESOURCEFUL attempt to weave social connection to realize the individual's improvement actions by intrinsic and extrinsic reward. RESOURCEFUL intend to become aligned with the study of Maccoby that emphasize on stimulating the people by providing the chance of mutual aid and reinforce the interaction by exchanging the positive feedback and recognition (Maccoby, 2010).

The idea of Time-credit is part of RESOURCEFUL to drive and activate the potential energy of a person in improvement activities. According to the finding presented in the literature review, Time-credit can create the intrinsic and extrinsic reward by appreciating the helping to the others (Cahn, 2000). These two rewards coordinate the energy of individuals to involve in improvement activities and foster a person's mutual trust between peers and organization (Burgess et al. 2016). We expect that exchanging time currency and positive feedback in RESOURCEFUL help to reinforce an individual's intention for their creative works and to flourish the trusty environment for their action. RESOURCEFUL include some cards for executing the action and achieving the behaviour. They can be seen in Figure 4.1

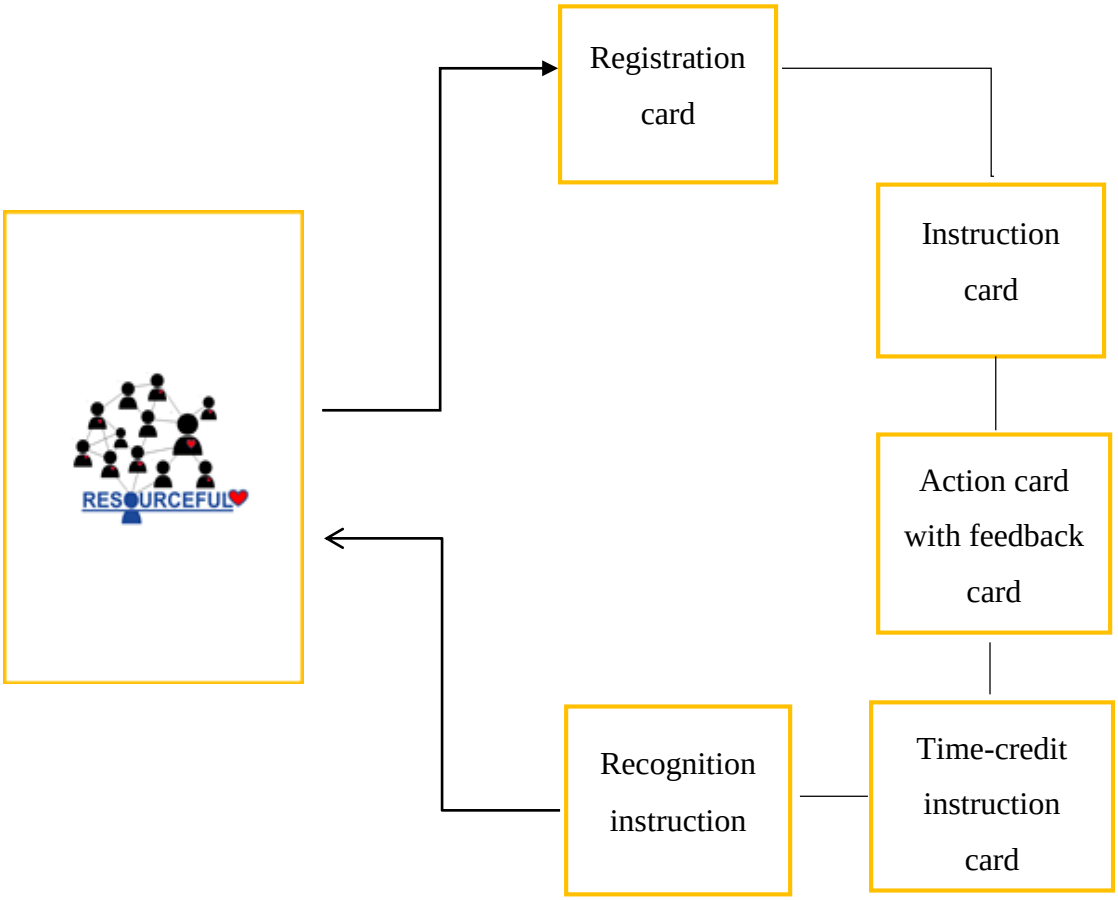


Figure 4.1 The components of RESOURCEFUL

The following section explains in detail each card and their instruction.

4.1.1 Registration card:

The registration card provides the membership ID for applicants who are interested in being members of the RESOURCEFUL network. Members should fill out the required information and send the card to the address in the card. Afterward, the applicant obtains the allocated ID number. Then they will receive an ID number, RESOURCEFUL cards and 15 hours for the interpersonal exchanges inspired by L'accorderie network in Quebec (L'accorderie, 2018). The members are interested to provide help and eager to improvement activities. Figure 4.2 illustrates the registration card.

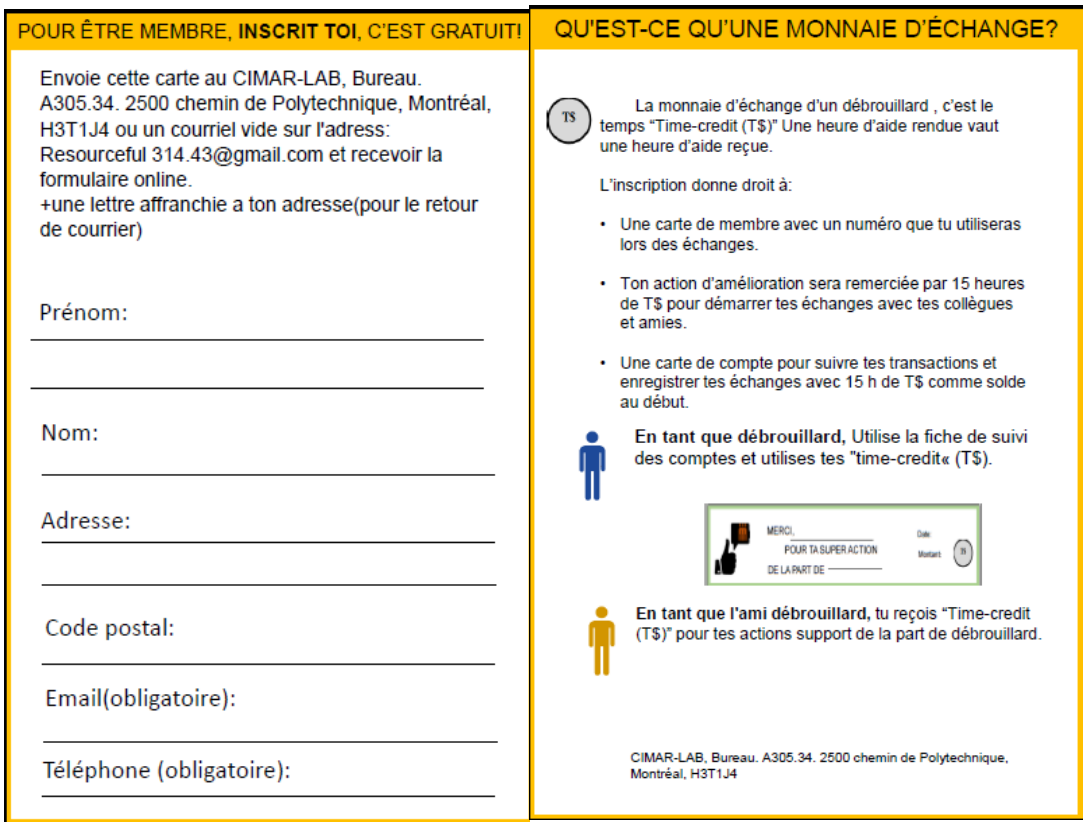


Figure 4.2 Registration card on the left side and Time credit description at the right side

4.1.2 Action card:

Resourceful consists of 10 actions cards. It is separated from another part by yellow colour. Each card presents the data about the name of the actor who participates as a leading actor "Débrouillard" and "expert," improvement opportunities, the idea and the amount of allocated time for realizing the idea. Table 4.1 describes the role of actors in each action card. Figure 4.3 shows the feature of an action card.

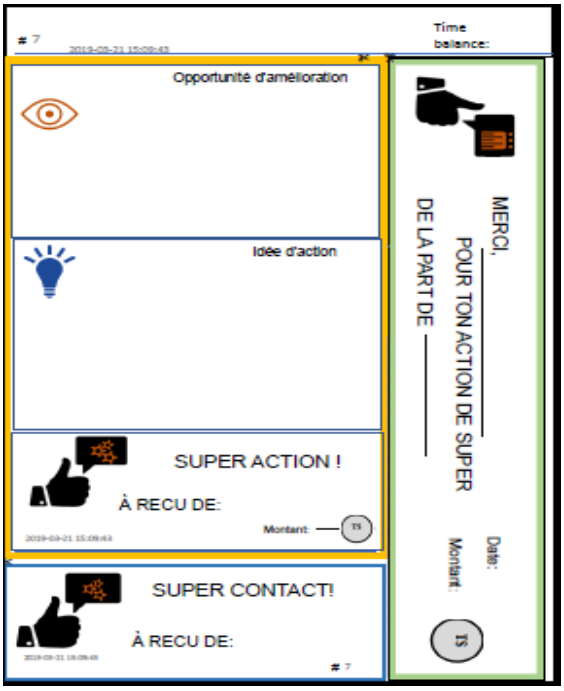


Figure 4.3Action card with positive feedback icon

Table 4.1 Role of actors in RESOURCEFUL

Role of Actor	Definition
Resourceful “Débrouillard”	A person who is engaged and has positive energy to his/her work, willing to improve his/her work. She/he identify the improvement opportunities and the idea who communicate about the idea to find a broker “passeur” an expert. Resourceful share the feedback with connector and expert. Also, she/her appreciates the help provided by the expert with exchanging the Time-Credit.
Expert “expert.”	The actor who give feedback and likes the possibilities to share a thought and helps others to realize the improvement action. An expert provides help and receives time-credit and positive feedback from Resourceful.
connector “passeur.”	This role assigned to the person who aids “Débrouillard” to find her/his expert. “passeur” may play the roles of “expert.” She/he receives positive feedback from Resourceful.

4.1.3 Instruction card:

This card provides detailed information telling the user how the member should apply for the cards in their improvement actions. A person who becomes a member of the RESOURCEFUL network can follow three steps to accomplish her/his action. The steps direct a person's improvement actions who could be known as a Resourceful.

Step 1: Move "BOUGE"

Formulating an observation and an idea of action. Then give an action card (yellow card) to a connection, communicating with her/him about the improvement ides. Asking to put in touch with the right person who can help for accomplishing the idea. The connector can become the expert or refer to someone else that he/she knows. This step should repeat until the person finds the right expert for her/his action.

Step 2: Act "AGIT"

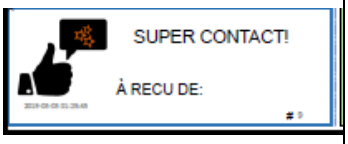
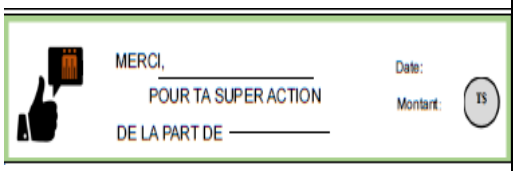
Take action with the expert. Together, take inspiration.

In the case of Cimarlab since we practice the S.T.A.R.S as a CI methodology, RESOURCEFUL can connect to it so users can register their action in S.T.A.R.S process but recording the card is not an essential process in this tool.

step 3: Thanks, "MERCI."

In this step, the actors provide positive feedback for their action. The resourceful person appreciates the received helps by offering time-dollar at the agreed amount. Base on this structure each member may play different roles include Resourceful "Débruillard," Connector "passeur" and Expert "expert." It means that resourceful person in other activities may accept the role of expert or broker and his expert and broker may play the role of each other or resourceful. Table 4.2 presents the process by the picture and Figure 4.3 shows the instruction card.

Table 4.2 Exchanging positive feedback process

	Resourceful "Débruillard"	connector "passeur"	expert "expert"
			
			

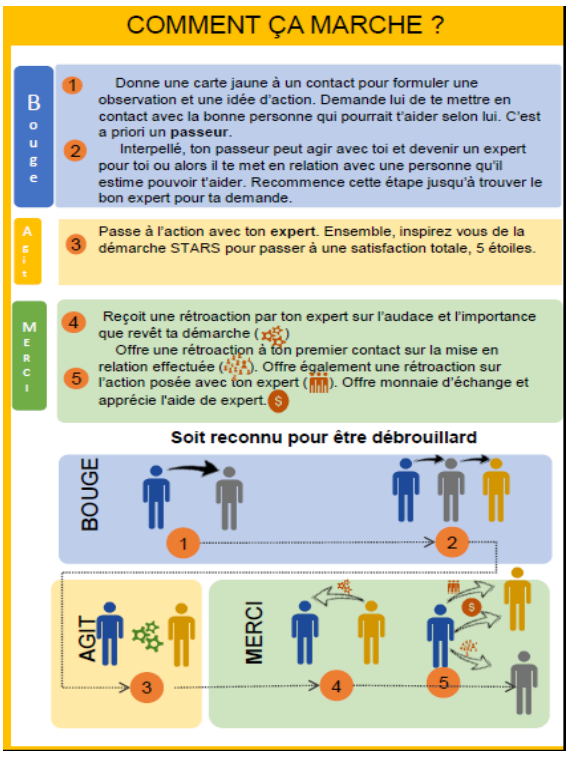


Figure 4.4Instruction card

4.1.4 The feedback cards

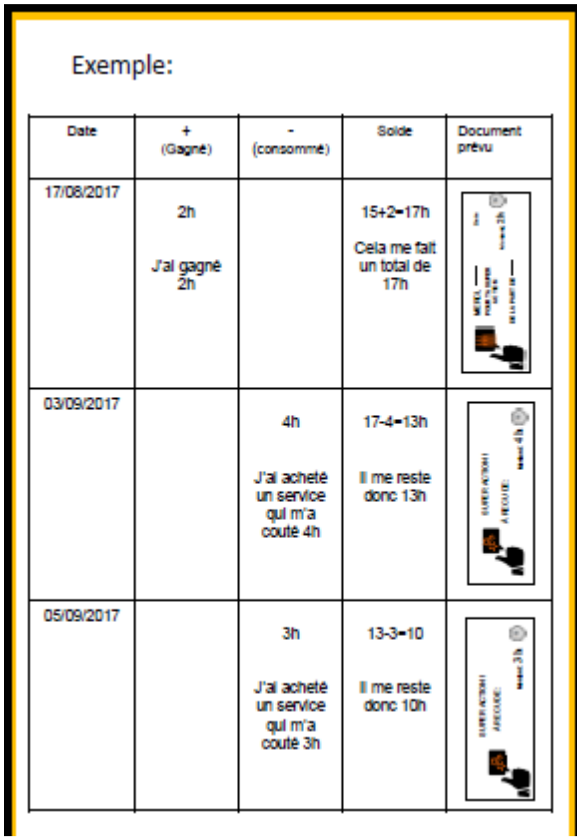
The cards include encouragement phrases, social icons to appreciate the actions and the name of receiver and giver. The feedback cards are attached to the "action card" and complete it. The Actors give positive feedback to their effort to support their actions. In this regard, depending on the role that individuals play, different expressions and icons are used. Table 4.3 illustrate the definition of each icon and the exchange flow between actors. Figure 4.4 demonstrates the feature of action cards and the feedbacks.

Table 4.3 Icons and exchange flow

#	Icon	Phrase	Feedback exchange Flow
1		“SUPER CONTACT!”	From “Débrouillard” to “passeur.”
2		“SUPER ACTION! ”	From“expert” to “Débrouillard.”
3		“MERCI POUR TON ACTION DE SUPPORT ”	From“Débrouillard” to “expert”

4.1.5 Time-dollar account tracking card “Fiche de suivi des Comptes.”

In this card, the amount of exchanged time-dollar should record by the person who provides or receives help. Actors can record the time-dollar transactions and manage the time available in their accounts. This card includes five columns for recording the related information about the date of the transaction, the amount of time received or consumed for performing actions, and the balance of time account. There is space for attaching the document at the end of each line. Figure 4.5 exemplifies how the time-dollar exchange works and presents.



Exemple:

Date	+ (Gagné)	- (consommé)	Solde	Document prévu
17/08/2017	2h J'ai gagné 2h		15+2=17h Cela me fait un total de 17h	
03/09/2017		4h J'ai acheté un service qui m'a coûté 4h	17-4=13h Il me reste donc 13h	
05/09/2017		3h J'ai acheté un service qui m'a coûté 3h	13-3=10 Il me reste donc 10h	

Figure 4.5 Example of Time-dollar exchange registration

4.1.6 Recognition certificate award instruction

RESOURCEFUL provides a recognition mechanism to acknowledge the members' improvement behaviour. It offers the Yellow belt, Green belt and Black belt certificate for recognizing the individual's improvement actions in organizations. In the RESOURCEFUL, the mechanism of belts, as a certification award, is an external reward that allows a further appreciation of resourcefulness by connecting the devoted time for improvement activities to the known external recognition in the organization. Moreover, actors participate in the assessment process for evaluating candidate eligibility. To attain the certificates, candidates should follow the pre-determined nominate structure and collect the requested criteria. An individual's efforts for improvement actions (action cards) and the exchanged positive feedback for their actions (feedback card) count for obtaining the performance certificate. The candidate provides the evidence then send them to the presented address to receive the Cimarlab performance certificate award, which is certified by Cimarlab. Table 4.4 describes the criteria of eligibility and the methods of candidates assessment. Figure 4.6 presents the recognition mechanism card.

Table 4.4 Recognition actions

Title of award for performance recognition :	**Nominate to:**	**Number of Feedback cards**	**Number of Action cards**	**Account tracking sheet**	**candidates assessment:**
Yellow belt	Participe	10	-	No	No referal
Green belt	Support	10	10	Yes	Three yellow belts who vote for the candidate
Black belt	Group creator	20	20	Yes	Three green belts support the candidate. They answer the questions about candidate involvement.

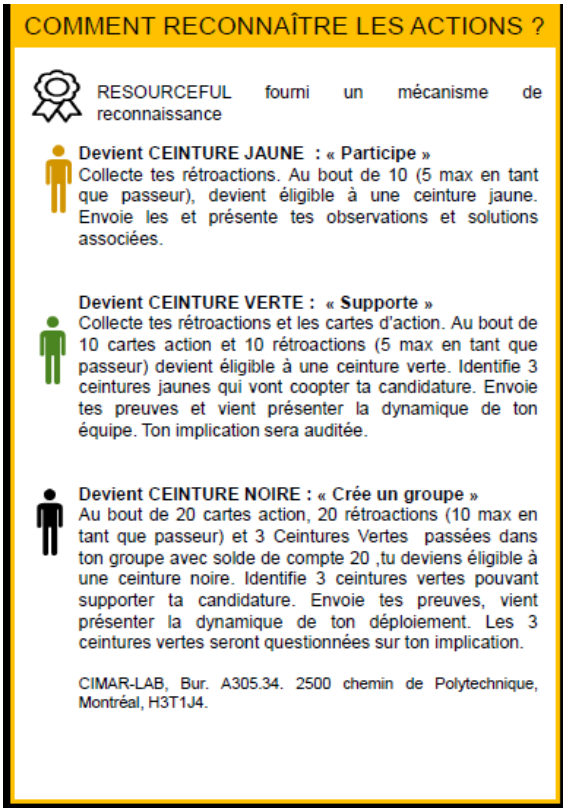


Figure 4.6 Description of the recognition mechanism

4.2 Data Description

This subsection provides the information to describe the participants who participate as users to evaluate the RESOURCEFUL. Six persons, including three men and three women, participated in the research test. Table 4.5 indicates the distribution of age between participants gender to which the respondents belong. Figure 4.7 illustrates the percentage of responses based on gender.

Table 4.5 Distribution of responses base on age

age	frequency	Percentage
Less than 30 years old	1	16.7
Between 30 to 35	2	33.3
More than 35	3	50
Total	6	100

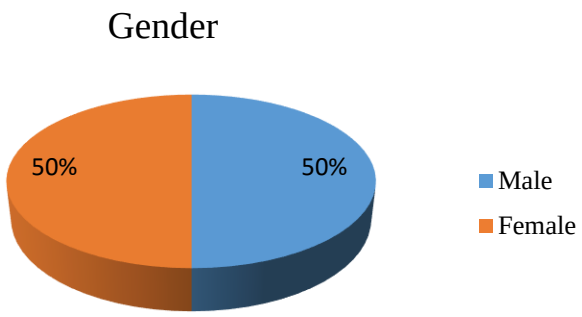


Figure 4.7 Description of responses by gender

4.3 Qualitative Analyses

In our study, the qualitative data from evaluating the open-ends question is the main resource that allows us to assess the interventional program. Although the quantative analysis is provided in the next section for this research, the more emphasize goes to qualitative results because it is the first time a tool is used.

When we asked participators about the benefits of RESOURCEFUL, the users pointed out the effectiveness of the tool that can be categorized into four factors; communication, self-efficiency and reward.

Communication: Four out of six participants cited being able to connect with others to share their idea as central aspects of RESOURCEFUL. They believe that having a structure for giving positive feedback in the resourceful is helpful.

PRA1 said, " when I received positive feedback I was surprised that my action was helpful and supportive for my friend. It motivates you to do it again."

PSH5 mentioned, "The possibilities of exchanging positive feedback is interesting because I encourage to talk about the improvement action and exchange the positive feedback for the help I received."

PMA4 cited, "Resourceful let you share the idea and receive positive feedback." Also, she said that "I enjoyed to have a paper-based tool because I can carry it anywhere and put it in my bag whenever I need it, I can use it quickly."

Self- efficiency: Moreover, three out of six participators firmly believe that they do not feel alone in the improvement activities.

PSH5 mentioned, “RESOURCEFUL provided a friendship climate and I did not feel isolated. When I got stuck in improvement actions, it showed a path to communicate it with others. In the case of lacking time, you benefit time-dollars available to progress in the action. She continued to say that discussing idea inspires you to build the idea. She believed the opportunities of asking help from the outside community was helpful when she was disappointed to find someone.”

PAI2 cited, “I do not feel alone. The resourceful provide the collaborative climate to connect to the community with the proposed tactic in RESOURCEFUL. ” she continued to explain having something such as feedback encourage you to seek others aids and also seek to help to other. PCA3 "I feel less alone. Resourceful allowed you to discuss the improvement action within your network and beyond Cimarlab. It simplifies participation and helps you to achieve the ideas by asking help from others.”

Reward: Four out of six participators said they think proposed reward such as certification recognizes their efforts in the improvement activities. PCA3 cited, “the recognition certificate to the members of RESOURCEFUL seems attractive and fair.” CRA1 cited, “ the certifications can count my effort very well and encourage me to play a different role in my community.”

CAI2 and CSH5 mentioned, “ the certificate may aid me to know the others characteristics toward improvement actions and direct toward the reliable participator to asking help and realizing my action.”

Participator in the research test often (five of six) perceived the time-dollars to count the improvement's efforts and not as a rewarding the behaviour.

PMA quoted, “ Time-dollar helps to record your improvements efforts. You can not feel time-dollars as a reward in the RESOURCEFUL. If we spend time-dollar, we can not force others to give you back time-dollars by their participation in improvement actions.”

on the other hand, we found out the helpful information from the user group during the interview. they expressed the improvement points and suggested some ideas to enhance the usability of the RESOURCEFUL based on their experience. Based on the answers to the open-ended questions about improvement ideas for the RESOURCEFUL program and about problems hindering their involvement, the answers were analyzed and grouped according to the ideas expressed. Table 4.6 highlights the user’s problems and Table 4.7 reports the users’ improvement opinions for enhancing the usability of RESOURCEFUL.

Table 4.6 Difficulties of RESOURCEFUL

Problems	# opinions
It is not more clear the reason for giving and receiving feedback.	4
Difficulties in predicting the amount of time-dollar to exchange between users and processing the transactions.	3
Losing coupons that we received in the period of applying the tool and no way of getting them back!	3
It was challenging to keep the commitment of partner to do their actions in the exchange of time-dollars received.	2
There are difficulties in tracking the exchanges and transactions while the number of actions increased, e.g. more than two.	2

Table 4.7 Improvement opinions

Improvement ideas and users needs	# opinions
Users need the dedicated times and efforts being registered somewhere else and become visible.	4
Users want to perceive more meaning at the feedback coupons with an explanation of the reason for receiving such the feedbacks.	3
Users want to be facilitated the distribution of coupons so that they do not tear and be quickly separated.	3

Conducting qualitative research enabled us to find out the improvement point and weakness of the proposed tool. Although the small sample size did not show valid information regarding the evaluating RESOURCEFUL, the interview results indicate the direction for future researchers. It guides them on how to improve the RESOURCEFUL as an interventional program based on the user's needs and responses to encourage their participation in CI activities. In the conclusion

section, we suggest some improvement elements for future research based on the responses received from users.

4.4 Quantitative analysis (Inferential Statistics)

Even though the sample is low for statistical analysis and us aware that six sample size is not enough to do a statistical test, but we decided to use it to assess the questionnaire and evaluate the impact of RESOURCEFUL as a tool that is used for the first time.

Table 4.8 reports the descriptive statistics of the research variables to include the number of replies, the lowest, the highest response selected by users and the mean. The number 2 refers to the responds "disagree", 3 = "neuter", 4 = "agree" and 5 = "strongly disagree"

Table 4.8 Descriptive statistics of research variables

Variables	Questions	N	Maximum	Minimum	Mean
REWARD	Q1	6	5	2	3.66
	Q2	6	4	2	3.167
COMMUNICATION	Q3	6	5	3	4.167
	Q4	6	5	3	4.167
SELF- EFFICACY	Q5	6	5	3	3.833
	Q6	6	5	3	4.500
SOCIALINFLUENCE	Q7	6	5	3	4.166
	Q8	6	5	4	4.500
	Q9	6	5	3	3.833
	Q10	6	5	3	3.833
	Q11	6	5	3	3.833
	Q12	6	5	3	4.166
INTENTION	Q13	6	5	4	4.333

Since we have a small sample The non-parametric methods adopted to investigate the responses of users in Cimarlab for evaluating the tool which is used for first time. The p-value expected to be high. In this case, we more focus on the non-numerical interpretation conducted base on Mean Ranks for evaluating the responses and finding something. The response with the "1= strongly disagree" takes the rank of "1" and the rank number of "5" assigned to "5= strongly agree" in all calculations. The decision rules to accept or reject the assumption is based on p-value calculation. We apply Friedman rank test, Binominal test, Kruskal Wallis test and Man-Whitney test to compare the responses of users. The acceptance criterion considered at the a= 0.05.

4.4.1 Friedman rank test

This research applied the Friedman rank test to rank the responses. We want to know whether four variables are the same priority to encourage users' improvement actions in the proposed methodology. The null hypothesis refers to "There is no difference priority between the response of four factors to fostering users' improvement behaviours." The alternative hypothesis states that "There is the difference between four factors to fostering users' improvement behaviours." If the amount of **p-value** is lower than 0.05, we reject the null assumption. Table 4.9 indicates the result of ranking Friedman rank test.

Table 4.9 Friedman rank test

Factors	Ranks mean	N	Chi-Square	P-value
REWARD	1.50	6	6.170	**.104**
COMMUNICATION	3.08			
SELF-EFFICACY	2.92			
SOCIAL INFLUENCE	2.50			

Base on the results, as we expected since the sample size is not enough the p-value is higher than 0.05 so we can not reject the null assumption that is equal priority assumption for the factors under investigation. Based on Mean Ranks, as illustrated in table 4.9, the rank means of each factor is different but not considerable.

4.4.2 Binominal Test

A Binomial test is a non-parametric test that examines success and failure based on a quantity. The purpose of success and failure is the presence or absence of a variable in the users' sample under investigation. In this test, the responses of each question divided into two groups of below and equal to 3 and above 3, and the observed proportion (P) from these two groups compared with a ratio of 0.5. It means our success rate is higher than 50 percent. Table 4.10 present the result of the test for question 13 (I act in ways that make me feel better about myself. I want to participate in improvement activities) and question 8 (RESOURCEFUL helps those other work colleagues motivate me to participate in the various improvement activities). To the other 12 questions, we refer readers to see Appendix C.

$H_{0:}$ P=0.5 and $H_{1:}$ P # 0.5

Table 4.10 the result of Binominal test

Variables	Group	Category	N	Observed Proportion	Exact Sig. (2-tailed)
Q8: "RESOURCEFUL helps those other work colleagues motivate me to participate in the various improvement activities."	Group 1	<= 3	2	0.33	0.031
	Group 2	> 3	4	0.67	
	Total		6	1.00	
Q13: "I act in ways that make me feel better about myself. I want to participate in improvement activities."	Group 1	<= 3	0	0	0.031
	Group 2	> 3	6	1.00	
	Total		6	1.00	

In the elements where the response frequency is above 3, the observed proportion is higher than the success rate, which is 0.5. As a result, the impact of factors is expected to be acceptable if the observation proportion becomes higher than 0.5.

For the question of 8 and 13, although we expected the p-value to be high, it is calculated 0.031, which is lower than 0.05, so we reject the null assumption. It means the frequency of responses above than 3 for question 8 is higher than 0.5 so we can learn something although the sample size of small. For question 13, regarding the intention of users, all the participators answered above three. Meanwhile, we can not reject the null assumption for another question, as illustrated in Appendix C for question 9 to 10. The frequency of responses below and equal three for question 9, 10 and 11 is equal to 50 percent. The frequency of responses above three for questions 1, 3, 4, 5, 6, 7 and eight is higher than 0.5. For question 2, 0.67 percent of user selected the response of below three.

4.4.3 Kruskal-Wallis Test

We decided to do The Kruskal-Wallis test, which is another nonparametric test and is used to compare three or more of the three groups. We applied this test to examine each of the research factors in the three age groups (K=3). The null hypothesis in this test emphasizes the lack of difference in the responses between the groups. Two hypotheses of null and alternative presented as follows.

$$\begin{cases} H_0: \mu_{Less\ than\ 30} = \mu_{\text{Between 30 and 35}} = \mu_{\text{More than 30}} \\ H_1: \mu_{Less\ than\ 30} \neq \mu_{\text{Between 30 and 35}} \neq \mu_{\text{More than 30}} \end{cases}$$

If the number of people in each sample is less than 5 and the number of groups is 3, then the Kruskal-Wallis test table should be used. So the Kruskal-Wallis test for the alpha rate of 0.05 with the (k-1) Degree of freedom is 5.600. If, after the Kruskal Wallis test for each variable, the H-value is higher than 5.600, we reject the zero hypothesis and accept that the variable in question is different in each of the factors. Table 4.6 illustrates the result of Kruskal-Wallis in age groups.

Table 4.11 The results of the Kruskal-Wallis test for the age groups

Variable (factor)	Age level	Number	Mean Rank	(H)
Intention	Less than 30	1	2.50	5
	Between 30 and 35	2	5.50	
	More than 35	3	2.50	
Reward	Less than 30	1	1.00	2.757
	Between 30 and 35	2	4.75	
	More than 35	3	3.50	
Communication	Less than 30	1	2.50	2.790
	Between 30 and 35	2	5.25	
	More than 35	3	2.67	
Self efficacy	Less than 30	1	4.50	1.275
	Between 30 and 35	2	4.25	
	More than 35	3	2.67	
Social influence	Less than 30	1	2.00	2.143
	Between 30 and 35	2	5.00	
	More than 35	3	3.00	

As the above table shows, the H-value for all of the factors is lower than 5.6. Therefore we can not reject the null hypothesis as we expected. So there is no difference between the three age groups.

4.4.4 Mann-Whitney Test

We decided to examine the difference between two independent groups for the variable with the scale and rank data by The Whitney U test. In this test, there are not any assumptions about the probability distribution of the data. First, the data ranks, then the differences between the ratings are examined. The Mann-Whitney test for the calculation of the differences between the two groups ranked the highest of the adjective to the lowest of both groups in the form of a single sum, regardless of which group the value belongs. We apply the “U” test to compare users’ intention in improvement activities and each of its dependent factors in the females and males group in Cimarlab during applying RESOURCEFUL. Table 4.12 indicates the result of U test.

$$\begin{cases} H_0: \mu_{Females} = \mu_{Males} \\ H_1: \mu_{Females} \neq \mu_{Males} \end{cases}$$

Table 4.12 The results of Man-Whitney test

Variable (factor)	Gender level	Number	Mean Rank	Sum of Rank	U	P-value
Intention	Male	3	3.50	10.50	4.50	1.00
	Female	3	3.50	10.50		
	Total	6				
Reward	Male	3	3.50	10.50	4.50	1.00
	Female	3	3.50	10.50		
	Total	6				
Communication	Male	3	2.67	8.00	2.00	0.261
	Female	3	4.33	13.00		
	Total	6				
Self-efficacy	Male	3	2.00	6.00	0.00	.043
	Female	3	5.00	15.00		
	Total	6				
Social influence	Male	3	2.67	8.00	2.00	0.275
	Female	3	4.33	13.00		
	Total	6				

In all variable, except self-efficacy, the p-value is higher than 0.05 so we can not reject the null assumption. In contrast, although the samples size is small for the self-efficacy variable, the p-value becomes lower than 0.05, so we refuse the null hypothesis equal mean rank. So we can assert that females selected a better preference than males for self-efficacy questions in the proposed tool.

4.5 Discussion

It may seem to have six users for evaluation become insufficient but in our study which we are trying to propose the program for the first time, that enable us to disclose the facts at the very beginning of the step and bring a way for further effort on the RESOURCEFUL. Performing qualitative analyze as a main action in evaluation the RESOURCEFUL allows us answer the first question on research and statistical analysis of survey helps to evaluate the users' opinion about tool on their intention to answer the second question of research. Researcher tries to combine the

qualitative and quantitative results to have an acceptable investigation. Based on qualitative and quantitative analyze, RESOURCEFUL can be helpful for maintaining an individual's involvement who is willing to act in improvement initiatives in Cimarlab. The users' responses categorized in four factors based on quality-quantity analysis.

1) **Communication**: The exchanging positive feedback coupons in RESOURCEFUL is a process that encourages members to talk about the improvement action and share their idea with their friend. The quantitative analyses of the questionnaire in Binominal test shows five out of six users selected response above three for the elements of communication factor which are "RESOURCEFUL encourages me to exchange my knowledge and experience with my colleagues" and "RESOURCEFUL helps me to communicate with my friends in terms of improvement initiatives openly and effectively." Probably RESOURCEFUL through the positive feedback coupons can create a supportive climate for the users' involvement.

2) **Social influence:** No more clue has been found via qualitative analyze of response except the citation of PRA1, "when I received positive feedback I was surprised that my action was helpful and supportive for my friend. It motivates you to do it again." It may be interpreted that peer feedback's coupon can present the positive impact of participator on their friend improvement actions. Unexpectedly, although the sample size was small, the result of the Binomial test presented the p-value lower than 0.05 for the element of "RESOURCEFUL helps other work colleagues motivate me to participate in the various improvement activities." All six users chose the answer above three.

3) **Self-efficiency**: The users of RESOURCEFUL believe that they do not feel alone. Their conversations in the interview session pointed out the Time-Credit availability and existence of feedback coupons encourage them to ask for help or seek to assist someone else. Perhaps the resourceful simplified their participation. By mutual aid, they probably may feel capable of completing variety improvement actions. Meanwhile, analyzing the survey in the Binominal table shows that four out of six responses of above three (>3) goes to the element "RESOURCEFUL helps me to feel capable of completing the different improvement activities in the workplace in an autonomous way.", and five out of six responses

above three (>3) regarding the element “With RESOURCEFUL, I am confident that I can ask another colleague or friend for help whenever I get stuck in the implementing idea.” although, for any assured claim in these two elements, we need a reasonable sample size in the statistical analysis. Firmly, the self-efficient factor in RESOURCEFUL more highlighted for the female users. Based on the Kruskal-Wallis test, unexpectedly, the self-efficient for the female group is more preference than the male group.

4) **Reward**: The users claim that RESOURCEFUL recognizes the effort of members in improvement activities. They remarked certification as an attractive reward for their action and gratitude of their participation. Significantly, the users just expressed time-credit to count their efforts. It seems the time-credit design in RESOURCEFUL was not perceived as rewarding. They need more introduction of Time-Credit as a new initiative currency.

Finally, to answer whether RESOURCEFUL as an interventional program based on mutual help and rewarding the actions can reinforce an individual’s intention and enhance the supportive peer network in improvement activities, it is possible to rely on the binomial test conducted in the statistical analysis of the survey. Tightly, all six users of RESOURCEFUL believe they act in ways that make them feel better about themselves, and they want to participate in improvement activities. The p-value for this dependant value is lower than 0.05, even the sample size was small.

Even though the sample size was small, but the results can point out we are going in the right direction. we could say that RESOURCEFUL be in the right direction to boost the peer network and there is a potential for reinforcing user’s intentions to participate in creative work by providing the supportive network and mutual help specifically for female.

CHAPTER 5 CONCLUSION AND RECOMMENDATION

Employees involvement is known as the heart of continuous improvement. Continuous improvement is the mindset of people who are eager to improve their work. Recent behavioural research investigated to understand the factors that encourage the employee's involvement.

They claimed that a supportive social network and trustful relation trigger an individual's decision to get involved in improvement activities and problem-solving. Once improvement action starts, it should be pushing forward by the energy of peers instead of being discouraged by them.

In this research, we provided the theoretical foundations for the employees' involvement in continuous improvement approach, then we explained the behavioural studies to describe the factors for enforcing individual's involvement. These factors resumed into communication, self-efficacy, social influence and the reward as the elements that affect individuals participation behaviour. Afterward, We described the recognition and Time-Credit as two rewards mechanism to enhance the supportive network.

we proposed the RESOURCEFUL as an interventional improvement program relying on mutual help to enhance individual's involvement. It has been created in the Cimarlab by the participation of members. Two reward processes in this tool try to support the intention of the members in the Cimarlab who are willing to participate in improvement initiatives. Consequently, we assume this methodology can encourage participation in creative activities. To investigate the design and applicability of the RESOURCEFUL, we assess the impact of the tool in the Cimarlab. Interaction with colleagues and friends consider as an opportunity to develop the tool. Connecting with the members who are final users of the program and can disclose the relevant facts is one of the advantage of our search in collecting the qualitative analysis, although, the small sample size for collecting results from the statistical analysis is insufficient.

It is possible to conclude that RESOURCEFUL has the potential to impact on members' behaviour by encouraging mutual help. RESOURCEFUL could reach to the acceptable results in the elements of encouragement consist of communication, self-efficacy and social influence. According to users, RESOURCEFUL may help them to communicate with their friends and encourage them to exchange their experience and knowledge the improvement activities. The possibility of exchanging positive feedback, the option of providing and receiving an aid and recognition certificate are the elements that users remarked to encourage their intentions.

RESOURCEFUL may help them to motivate by their colleagues, and the female users precisely believe in the potential of RESOURCEFUL in the self-efficient factor that encourages the intention.

Regarding the Time-credit mechanism of Cahn and Gray (2015), our design in the performing of Time-Credit needs to be reviewed. Time –credit design process was not be perceived by the users as we expected based on the literature review to reinforcing intention, and the expected intrinsic reward could not be perceived.

This study provides some acceptable indications for the possible effect of RESOURCEFUL on reinforcing the users' intention and show we are in the right direction to encourage and reward the action of an involved person in improvement initiative by fostering peer network based on mutual aid. Our investigation in improving the effectiveness of RESOURCEFUL can be still ongoing and perhaps enhance its usability.

Future work can concentrate on improving the prototype of RESOURCEFUL and providing the next version of RESOURCEFUL with considering the user's needs and improvement idea to enhance the usability of the tool and perceived enjoyment. We recommend to conduct and organize the experimental test on the different organizational context and improving the finding of quantitative analysis by acceptable sample size. We recommend:

1- Improving the Time-credit design process and considering the process to reduce the desire of being free-riders.

2- Modify phrase of the feedbacks cards to create motivated meaning.

3- Simplify the usability of the card in the case of distribution and gathering the cards.

4- Improve the enjoyment of participation. The users needed their dedicated times and effort being registered somewhere else and become visible! This may improve joy. Future work may focus on proposing a gamification element for improving enjoyment could be a solution in the non-game context through trigger a sense of competition among member and sustain the involvement. (McCallum, 2012).

5- For the second version, we recommend evaluating the tool with the concept of motivational affordance. This perspective helps to understand how the elements of design in RESOURCEFUL

can support users' motivational need, including social, cognitive and emotional needs. According to the researcher, these motivational needs can comply with enjoyment (Zhang & Lowry, 2015)

6- Test the RESOURCEFUL in the different organization.

We hope the proposed future works on RESOURCEFUL would be helpful in fostering a reliable peer network for creative activities.

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APPENDIX A SURVEY

This survey is provided to evaluate the RESOURCEFUL. RESOURCEFUL is an interventionist tool for improving your actions at Cimarlab. The primary purpose of RESOURCEFUL is to strengthen your supportive environment for optimizing efforts in improvement activities. Your contribution helps us evaluate the tool with those who are interested in participating in quality improvement initiatives.

PART I

1) gender: Female ☐ Male ☐
2) Age: less than 30 ☐ between 30 to 35 ☐ more than 35 ☐

PART (II):

Factors	Questions	Strongly disagree	disagree	neutral	agree	Strongly agree
Reward (Question 1 and 2 measure the exceptions of users in connection with the relationship between their effort inside continuous improvement activities and the possible rewards given in RESOURCEFUL	1) The certifications are attractive and encourage my effort in improvement activities.					
	2) Time- credit is attractive and encourages me to dedicate effort and energy in improvement activities.					
Communication (question 3 and four deals with the existence of a proper communication channel in RESOURCEFUL)	3-RESOURCEFUL encourages me to exchange my knowledge and experience with my colleagues.					
	4-RESOURCEFUL helps me to communicate with my					

	friends in terms of improvement initiatives openly and effectively.					
Self- efficacy(Question 5 and six measure the self-efficacy (confidence in their abilities) of users to participate in the CI activities in their workplace)	5 - RESOURCEFUL helps me to feel capable of completing the different improvement activities in the workplace in an autonomous way.					
	6-With RESOURCEFUL, I am confident that I can ask another colleague or friend for help whenever I get stuck in the implementing idea.					
Social influence (Question 7 to 12 refer to social influence factors. this factor reflects all possible social influences the participators may receive from closely related people (family, friends, colleges)	7– I believe RESOURCEFUL helps that my support network thinks positively about my participation in various improvement activities.					
	8- l believe RESOURCEFUL helps that other colleague motivates me to participate in the various improvement activities.					
	9-RESOURCEFUL is helpful for me to make new friends while performing improvement activities.					

	10. RESOURCEFUL is helpful for me to maintain good relations with my friends while performing improvement activities.					
	11-RESOURCEFUL is helpful for me to have an impact on other users.					
	12- RESOURCEFUL is helpful for me to follow leaders of the community so I can seek for their suggestions and help in terms of performing improvement ideas.					
Employee's behavioural intention	13- I act in ways that make me feel better about myself. I want to participate in improvement activities.					

APPENDIX B INTERVIEW QUESTIONS

User-focused questions for understanding user's opinion and expectation about RESOURCEFUL:

Each question should be answered with specific examples. (Note: each participant has the RESOURCEFUL prototype. In case of need explanation, the interviewer can use the example.)

Name of participator:

1) what are the benefits and disadvantages of RESOURCEFUL?
2) Do you think RESOURCEFUL support your involvement in improvement actions? How and why?
3) Base on your experience, how do you think about
    - Credit-time exchange mechanism
    - feedback exchange mechanism
    - Recognition reward mechanism
4) What do you like about applying the tool in your improvement actions?
5) What should be changed about the RESOURCEFUL approach?

Is there anything else that you would like to add in?

APPENDIX C BINOMINAL TEST RESULT

Table C.1 Results of Binomial test

		Category	N	Observed Prop.	Test Prop.	ExactSig.(2-tailed)
Q1	Group 1	<= 3	2	.33	.50	.687
	Group 2	> 3	4	.67		
	Total		6	1.00		
Q2	Group 1	<= 3	4	.67	.50	.688
	Group 2	> 3	2	.33		
	Total		6	1.00		
Q3	Group 1	<= 3	1	.17	.50	.219
	Group 2	> 3	5	.83		
	Total		6	1.00		
Q4	Group 1	<= 3	1	.17	.50	.219
	Group 2	> 3	5	.83		
	Total		6	1.00		
Q5	Group 1	<= 3	2	.33	.50	.687
	Group 2	> 3	4	.67		
	Total		6	1.00		
Q6	Group 1	<= 3	1	.17	.50	.219
	Group 2	> 3	5	.83		
	Total		6	1.00		
Q7.	Group 1	<= 3	2	.33	.50	.687
	Group 2	> 3	4	.67		
	Total		6	1.00		
Q8	Group 1	<= 3	0	.00	.50	.031
	Group 2	> 3	6	1.00		
	Total		6	1.00		
Q9.	Group 1	<= 3	3	.50	.50	1.000
	Group 2	> 3	3	.50		
	Total		6	1.00		
Q10.	Group 1	<= 3	3	.50	.50	1.000
	Group 2	> 3	3	.50		
	Total		6	1.00		

Table C.1 Results of Binomial test (cont'd and end)

Q11	Group 1	<= 3	3	.50	.50	1.000
	Group 2	> 3	3	.50		
	Total		6	1.00		
Q12	Group 1	<= 3	2	.33	.50	.687
	Group 2	> 3	4	.67		
	Total		6	1.00		
Q13	Group 1	<= 3	0	.00	.50	.031
	Group 2	> 3	6	1.00		
	Total		6	1.00		