Jazz Improvisation for Effective Design Collaboration

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Abstract: In this paper, we attempt to investigate a potential way to improve group ideation practice in collaborative situations in design. Our research identified that it is difficult to develop innovative and compelling product because of challenges such as, strong market competition, and rapid technological improvement. In addition, an interesting challenge on top of the aforementioned ones is how to develop products in the era of globalization. Some have employed collaboration as a way to overcome these challenges and reported that collaboration provided a clear advantage in terms of facilitating creativity and team dynamics. However, they also note that it is not an easy task to implement nor is it a guaranteed process for successful or fruitful results. To respond to the importance of the collaboration, this paper insists that the collective context of a jazz ensemble would improve collaborative activity in design practices. Through careful ethnographic observation of a jazz jam session, we found that impromptu and serendipitous musical ideas are generated and managed by musicians during their jam sessions and looked for how the musicians improvised musical ideas through collective activities by interacting with other musicians. In addition, we also focused how they collaborate together in sync rather than in conflict. To assess the potential of this new collaborative activity, we used the comparative method and analyzed a collaborative design workshop with a jazz ensemble's jazz session. The idea behind this study is not to provide a new modus operandi for product design development, but to intensively analyze improvisation, point out its uniqueness, and open discussion about the potential usage (or existence) of this knowledge in interdisciplinary collaborative design ensembles.

Key words: Design Collaboration, Jazz Improvisation, Creativity, Group Idea Exploration

1. Introduction

One of the most successful jazz albums in music history is Miles Davis's album, "*Kind of Blue"* (Figure 1). To record the album, Miles invited a group of musicians to a studio in Manhattan for a jam session. Even though some of them had never met before, they recorded the remarkable masterpiece in a single day through effective improvisational collaboration. In new product development, similarly, collaboration has been a critical topic for creating an innovative product. According to a survey of US firms in 1995, more than 84% of innovative product development projects employed cross-functional team collaboration (Griffin, 1997). Also, another study reports that 80% of R&D departments in 244 firms in Western Europe, Japan and North America completed their work on time and for the market of new products by using multifunctional team collaboration (Robert, 1995). Due to strong market competition, technological complexity, and their cultural and social diversity, collaboration has become an inevitable task for almost all organizations in order to integrate multiple perspectives and different domain knowledge to create innovative and compelling products. Perry and Sanderson (Perry, 1998) emphasizes that a

design practice is no longer recognized simply by a designer's individual intelligence but rather as a situation in which joint and coordinated activities occur. For this reason, the numbers of organizations have employed a number of tools and methods such as brainstorming, group sketching and co-design for facilitating the process of collaboration.

Figure.1 Mile Davis's album, Kind of Blue released in 1959 and a picture of its recording sessions in New York (resource from http://artmodel.wordpress.com/2010/03/01/kind-of-blue/)

The idea of collaboration and the propaganda about its ability for meaningful interactions and productive design session sits in stark contrast to the reality of how difficult it is to collaborate. Indeed, collaboration may cause a disastrous lack of productivity (Coutu, 2009). In order to the number of negative design situations and increase team effectiveness and accelerate creative idea generation process, this study attempts to investigate the following research questions; *1) how participants in a collaboration behave in order to improvise ideas, 2) how the music ideas are generated and developed while musicians interact each other, 3) how conflict and discordant opinions are amalgamated in a jam session.* These questions are asked in order to build a metaphor between the jazz ensemble and design collaboration in improvised situations. Ultimately, we present a discussion concerning the likelihood of the use of improvisation – and of its key aspects – in the creation of innovative design solution.

2. Defining Improvisation

According to dictionary, the word 'improvise' is defined as "1) to compose and perform or deliver without previous preparation; extemporize: to improvise an acceptance speech; 2) to compose, play, recite, or sing (verse, music, etc.) on the spur of the moment; 3) to make, provide, or arrange from whatever materials are readily available; 4) to compose, utter, execute, or arrange anything extemporaneously." (www.dictionary.com). The word, improvisation, is originated from a Latin word, "Improvisus" which means "not seen ahead of time" (Barrett, 2002; Akgün, 2002). Different disciplines have slightly varied interpretations of its meaning based on their subjective nature such as "responding to unforeseen challenges"(Blum, 1998) in the performing arts; "thinking in the midst of action" in education, "acts of composing and performing are inseparable" in communication, "reading and reacting in parallel" in sports psychology, "real-time composition" and "making decisions affecting the composition of music during its performance" in music, and representing "no split between design and production" in organizational studies (Moorman, 2002). In the field of organizational management, particularly, improvisation has been understood as an ad hoc activity for team working, product innovation, new product development and innovation listed in table 1.

Table 1. Definition of Improvisation across relevant literatures in Design

Author	Definition	Field of Study
Kamoche and Cunha (1997)	The ability to compose and perform contemporaneously (p.362)	Team working
Kamoche and Cunha (1998)	The merging of composition and performance, where both happen contemporaneously (p.5)	Product Innovation
Moorman and Miner (1998)	When the composition and execution of an action converge in time (p.1)	New product development
Miner et al. (1996)	actions, both spontaneous and novel, that result in the creation of something while actions are unfolding	New product development
Brown and Eisenhardt (1997)	Combin[ing] limited structure with extensive interaction and freedom [to make changes] on current products' (p.3); '… an organizing strategy of "making it up as you go along", (p.15); 'it means creating a product while simultaneously adapting to changing markets and technologies'	Innovation
Eisenhardt and Tabrizi (1995)	Rapidly building intuition and flexible options so as to cope with an unclear and changing environment' ; '…combin[ing] real-time learning through design iterations and testing with the focus and discipline of milestones and powerful leaders'	Innovation

As you can see, table 1 emphasizes issues of convergence between conception (i.e. composition) and execution (i.e. performance) as key attributes of improvisation (Moorman C. a., 2002). More specifically, three major characteristics of improvisation have been discussed. First, improvisation is "deliberate," which means it is an outcome of intentional efforts through a systemic process (Miner, 2010). In other words, improvisation does not happen by accident but is cultivated through a conscious interaction with others. Second, improvisation is "extemporaneous". Because it occurs through conscious interactions among others, phenomena such as unexpected reactions, serendipitous responses, and accidental discovery could possibly be happened. Third, the deliberate consciousness and the extemporaneous situation require continuous actions both through cognitive and physical actions. For example, jazz musicians conduct actions by, composing a song and playing a musical instrument simultaneously.

2.1 Improvisation and Creativity

In the design process, collaboration is often conducted to increase creativity in the early ideation process. Even though creativity is known as an outcome from an individual's internal cognitive process based on his or her life experience, culture, obtained knowledge, and personal interests (Campbell, 1969), some researchers assert that creativity tends to be better performed in a social setting such as a team collaboration (Mamykina, 2002). Furthermore, Csikszentmihalyi (Csikszentmihalyi, 1996, p. 23) stresses that the relationship between creativity and collaboration as follows: "Creativity does not happen inside a person's head, but in interactions between a person's thought and a sociocultural context." Likewise, Jackson and his colleagues (Jackson, 1995) also stress that "sharing and combining activities with others possessing diverse domain knowledge and perspectives helps to produces more creative thoughts".

In similar vein, improvisation which is about creating novel actions would be affected by the change of outside stimuli. Depend on whatever materials readily available, an improviser could conduct "off the cuff" spontaneous

activity that could be explained with terms such as "playing it by the ear", "taking it as it comes", and "making it up as we go along". Therefore, it is necessary for improvisers to do frequent adjustments with creativity in the change of external condition. With the serious consideration of the two aspects, novelty and adjustment, improvisers should prepare a 'playground like a place' to facilitate their creative actions in a group situation.

Then, what should be considered for design collaborations seeking the distinctive aspects of improvisation such as serendipity and extemporaneity? To further investigate these claims, we conducted an ethnographic observation of jazz jam session to understand how jazz musicians cope with conflict, improvise musical ideas, manage personal friction as well as collaborate with other musicians. We decided to observe a jazz ensemble because the nature of their collaboration is similar as that of design practices in terms of seeking novel solutions, serendipitous ideas, and impromptu activities.

3. Methods

Considering the scarce study of group improvisation and design teams, we first observed a jazz ensemble jamming without any script or score. The selected band consisted of five musicians; a drummer, a pianist, two guitarists and a bassist and conducted the jam session in a basement of one of musician's house in Ottawa, ON, Canada. During the jam session, the musicians would improvise naturally without any interference and played an impromptu performance with no intent other than to generate new musical ideas. The second study took place in an interdisciplinary design workshop to design a studio space for master student in a design program at Carleton University in Ottawa, Canada. Four instructors, from different departments - Industrial Design, Systems and Computer Engineering, and Anthropology - attended the session as a team and conducted co-designing to create innovative and compelling ideas to design the studio space. For the purpose of data gathering, the two sessions were videotaped and analyzed based on the following issues; particular behaviors to improvise ideas, to generate ideas, and to manage conflicts.

4. Data Analysis

The recording of the jazz jam session was analysed so as to response to the three research questions mentioned above. For the purpose of analysing the data, different parameters were assigned. First of all, we focused on behaviours when they played a song together and looked for *"how they behave to improvise ideas?"* while they jammed together. Second, we observed how the music ideas evolved while musicians interacted with each other by focusing on watching "*how different musical ideas from individuals are shared (negotiation) as well as how improvisation occurs and engenders creativity?"* Third, careful observations have been made to see "*how they manage and transfer the negative situation such as conflicts to the positive such as mutual agreement."*

4.1 Leading and Following Roles

In the jam session, the musicians used musical instruments to produce and modify rhythm and notational structures such as chordal phrases and solos. It observed that there were constant rotations between leading and following roles during the jam session. When they were a follower's role, accompaniment and listening were obvious behaviours in their interaction. The following role is characterized by their body movements such as eye

contact, head nod, or humming and it indicates that they were listening attentively. Specifically, the guitarists and the vocalist were predetermined leaders and the bassist and the drummer were natural followers. Disruptions were mostly performed by the drummer by making different turns that would change the song tempo, and solos were dominated by guitarists. Initiation and supportive attitudes such as listening and acceptance were performed by all members of the group. Furthermore, the acceptance of a different fellow's musical ideas was especially remarkable. Agreement, considered a rule in improvisation, is an important attitude to adhere to since it results in supportive behaviours such as repetition or development of one's suggestion or idea as if the group embraced and sustained every idea offered in the performance. In sum, the musicians are able to execute their musical ideas by playing a musical instrument. Specifically, playing a musical instrument of one's idea would be a way to transfer the ideas from abstract statement to tangible material that people could hear and evaluate. In addition, during the jam session, multiple actions are performed at the same time such as: composing musical ideas, playing the idea by playing a musical instrument, and checking its harmony.

In the design workshop, on the other hand, materials like paper, foamboard, duct tape, Velcro and so on were provided for participants to visualize their design ideas in tangible forms like sketches and 3D prototypes (Table 2). Mutual agreement while they interacted each other was represented by different verbal expressions such as "Ok", "I agree...", and "Yeah!" that indicated positive responses. Participants made extensive notes during the ideation phase as well as diagrams and sketches to organize and present ideas during the conversation. Due to the nature of activities, the speed of idea execution in design process was much slower than one in the jam session.

Table 2. Following and leading behaviours in music and design sessions

Following	**Leading**
Listening	Initiation
Agreement, Acceptance	Soloing, Speech
Sustaining, Support, Embracement	Disruptions

4.2 Idea evolution and Mutual agreement

Musicians went through a probationary period in the beginning of every song. By producing errors they elaborated on a song by fixing mistakes, adapting it to a new direction, and then refining the structure of the improvised songs. To probe and elaborate they mostly kept eye contact almost trying to copy each other and reach a consensus. Repetition was a signal of refinement on which musicians developed solos and rhythmic turns. Authentication was characterized by smiles and dancing indicating that musicians had achieved the "groove", the moment in interaction when the ensemble is in sync.

Musical ideas are evolved through playing music and conversing evolves through a probative and elaborative process in which performers test, experiment, refine and authenticate ideas. In this analysis we assume that the process of validation is a progressive method starting with probation and then elaboration until the group achieve a mutual agreement of ideas being negotiated. In probation the groups produce errors, try out some melodies and exchange different opinions. In elaboration, participants refine and authenticate performance. We presume that in

validation team members reach a performance structure when probation and elaboration are performed simultaneously.

In the design situation, talking was the main action equally performed by all participants who led the discussions by speaking out ideas, telling stories related to the project, and interrupted each other's line of thought by firstly agreeing and then contrasting the discussion with a different opinion. Besides agreeing, followers listened by keeping eye contact and nodding. In addition, participants probed and elaborated ideas mostly by suggesting and questioning an individual's offers to the performance. Validation was reached when mutual agreement was marked by compliments to the generated ideas. They also draw sketches and built some prototypes with available materials and founded objects such as furniture in the room to play with their ideas. Ideas that could not evolve past a certain point, misunderstandings and uncertainty were the main conflictive issues in the middle of contradicted discussions and queries about the project problem. From time to time, members would stop working collectively and be absent from the group performance. Both observations showed that performing the dual activities, composing and playing in jazz and ideating and visualizing in design, is critical to make idea evolve, and to manage conflicts during collaboration. Through the dual activities, participants were able to navigate the three phases, ideation, embodiment and critique, simultaneously.

4.3 Three phases

Based on the observation described above, we conclude that improvisation occurs in group collaboration and could be better performed in a certain conditions. Believing that improvisation is more successful in communal and social interaction, this study suggests three stages as bases for participants to expand and enhance their improvisational aspect in a collaborative design situation.

4.3.1 Ideation

The first phase, "ideation," is about creating and generating novel ideas. For example, participants both in the jam session and the design workshop proposed in this study got involved in this phase intuitively and attempted to generate novel ideas. The topics to start the conversation are about previous experiences, anecdotes or some of relevant information from media (e.g. newspaper, magazine, etc.). During the conversation, latent needs and desires are sometimes revealed which provides good market opportunities (Murphy & Kumar, 1997). This phase would be more productive if participants are physically interacting with tangible artifacts to help them execute ideas and share different perspectives together. Moreover, swift realization of ideas would be also crucial for obtaining immediate feedback and promptly refining discussion in design collaboration. As Csikszentmihalyi said, "Originality, freshness of perceptions, and divergent-thinking ability are all well and good in their own right, as desirable personal traits. But without some form of public recognition they do not constitute creativity (Csikszentmihalyi, 1999)." Thus, it is important to actively promote mutual interactions between an individual and a group of people in a team collaborative situation to facilitate the ideation phase.

4.3.2 Embodiment

The second phase for facilitating improvisation in group collaboration is embodiment. This is a place where individual's internal thoughts and ideas are externalized in a certain physical and tangible structure. Because ideas

are a fragile and ephemeral that easily disappears, embodiment is crucial to transform abstract ideas into visible and tangible substances.

In the Jazz jam session, for example, a musician executes musical ideas in rhythm and tempo through playing a musical instrument so that he can hear his idea as well as others. In the design workshop, on the other hand, participants often come up with a serendipitous idea while they conduct sketches or interact with a prototype. Once the initial idea was tangibly presented by a designer, others started to add another ideas to refine and improve the concept. Such behaviour shows that idea embodiment is not only a representation of one's intended subject matter but also that of unintended potential that may turn out to be an appropriate solution later. In other words, idea embodiment may act as a trigger that led people to think of something relevant but unexpected or served as an inspiration for further design activities in team collaboration. Without embodiment, it is impossible to share ideas and thus increase efficacy of ideation in order to evaluate and test the ideas. Another observation from both collaborations about embodiment was that the first embodiment of an idea could trigger following ideas and elicit questions that merit further investigation.

4.3.3 Critique

Once an idea is embodied in a physically contactable form that can give people something real, the last phase, critique, is accelerated. During this phase, people debate and argue about possibilities, limitations, problems, potentials, as well as conflicts to refine suggested ideas and narrow down to specific solutions. During critique, people can learn about others' opinions and perspectives, reduce misunderstandings of a given idea and negotiate to eliminate conflicts. Therefore, critique involves envisioning the future state of the design by reflecting on the current situation.

So far, we discussed the three phases in group collaboration. We strongly believe that if done properly, the three phases will increase the efficiency of improvisation in group collaboration if they are interchangeably iterated during a collaboration process.

5. Result

5.1 Flow of Group Dynamics through the Three Phases

Figure 2 illustrates the flow of group collaboration in design based on the three phases, Ideation, Embodiment and Critiques. In the ideation phase, firstly, the source of the idea is initiated by an individual's imagination. He or she then tries to develop the initial ideas more in detail by him or herself. Then, the idea is embodied in a certain form so as to share it with others. In the Jazz jam session, the musicians played a song by musical instruments to embody their musical ideas into melody so that others can hear the musical ideas. In this situation, the musicians must have a good enough skill to play the musical instrument to illustrate the idea.

In design, similarly, sketches, diagrams or early low fidelity prototypes are often used as mediums to transfer initial ideas into a physical and tangible form. Like the musicians, it is also a required operational skill for a designer to make a correct transition of his or her ideas into a tangible form. Once the idea has been in a certain way, then it can be shared with others. Therefore, the embodiment phase is a place where active group collaboration begins. Once the personal idea has been embodied in a certain form, it turns into experiential property so that people could review, test and evaluate it. In addition, during the embodiment phase, a great deal of

experiential information is accumulated and discussed. Now, the individual's ideas could be tangibly described and sometimes cause conflict or disagreement. Through careful and considerable processes of critique, the conflict and disagreement could be negotiated and discussed and may create a forward momentum for a team to develop the idea further. In sum, people in a group collaboration situation tend to develop their own idea based on their personal competency, then, the idea is executed in a certain tangible form through a media (e.g. a musical instrument, sketches, prototypes etc.) for the purpose of testing, experimenting and improvising the idea further.

In the critique phase, the improvised ideas are negotiated and harmonized with others. Then, it may trigger others' imaginations to generate new ideas. This iterative process involves the three phases and was observed both in jazz jam session and the design workshop. We insist that this is a fundamental mechanism of any kind of team collaboration with improvisation. If one of phase is missing or poorly performed during collaboration, its outcome will be less useful, and its process might not be so productive.

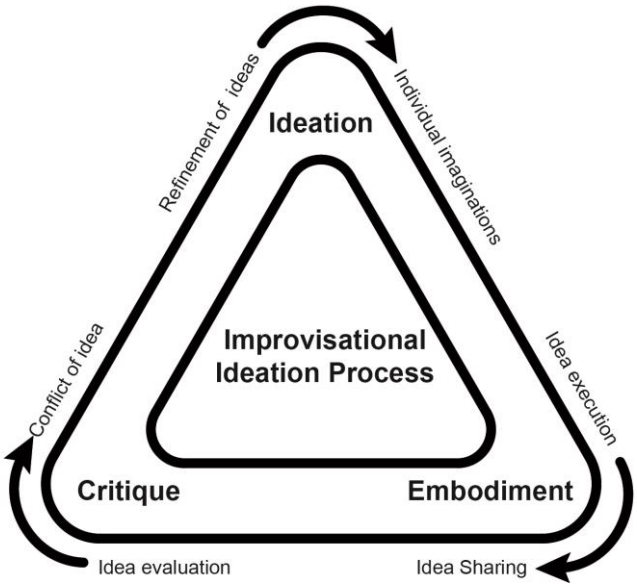

Figure.2 Improvisational ideation process through the Three Phases, Ideation, Embodiment and Critique

5.2 Summary

Based on the empirical research in this paper, we conclude that the three phases, if done properly, could increase the efficiency of group collaboration and improvisation process. As Engeström stressed, "initial abstraction is enriched step by step and transformed into a concrete system of multiple, constantly developing manifestations (Engeström, 1999)". The iterative circular process of the three phases would be a critical driving force to turn an individual's early vague thoughts and ideas into a clear design solution and to transform controversies and conflicts into a mutual agreement. In addition, we suggest the simultaneous dual activities, composing and playing, for improvisation in a jazz ensemble should be applied to design collaboration as well so that participants in the collaboration could promptly execute, try out and test serendipitous ideas with others. We also insist that while the cycle of the three proposed phases is repeated multiple times, the initial ideas could trigger people's imagination and improvisation, and it could get materialized through repeated embodiment and then improved through critique.

It could be said that newer and improvised ideas keep coming since the form of ideas themselves takes a newer

form as the process is iterated. Hence, the iteration is not just a repetition of the same level of actions but one with developmental momentum. Finally, this study emphasizes that successful group collaboration and improvisation must be based on the mutual respects and accepting of their differences and uniqueness.

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