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Facilitating creativity in interdisciplinary design teams using cognitive processes: A review

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Facilitating creativity in interdisciplinary design teams using cognitive processes: A review

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Abstract

Interdisciplinary, or cross-functional, teams have become quite common for engineering and design. Many of today's scientific breakthroughs occur in interdisciplinary teams, as the increasingly complex problems facing society often cannot be addressed by single disciplines alone. However, fostering creative and productive collaboration in interdisciplinary teams is no easy challenge. First, leading creative teamwork is difficult by itself. Second, many of the factors that impede teams and teamwork in general are exacerbated in interdisciplinary teams as a result of differences between team members. In this paper, we will review the team creativity psychology and management literature, and discuss how cognitive processes that facilitate creativity can be used by engineering and design teams. Specifically, past research has shown problem construction that allows teams to develop a structure to guide solving ambiguous problems. Further, problem construction allows teams to develop a shared understanding of the problem which aids in later processes. While there is significant research on idea generation, results suggest that teams may not be better at this than individuals. In this review, we discuss how idea generation in teams can mitigate some of the issues that lead to this effect. Finally, team research has only recently began to determine what factors influence idea evaluation and selection for implementation.

Keywords

Review, interaction, teams, creativity, innovation, interdisciplinary teams, engineering, design, creative problem solving

The use of interdisciplinary, or cross-functional, teams in organizations, especially for engineering and design, is on the rise.[1] The rapid change and adaptation required to ensure organizational success and survival in innovation-driven or knowledge work environments have led organizations to move away from a hierarchical and static structure to a more dynamic, team-oriented, and cross-functional structure.[2] In addition, the problems that faced by engineering and design firms today are generally too complex for one individual or team from one discipline to solve.[3–5]

Interdisciplinary, or cross-functional, teams include a variety of members representing different stakeholders from within and outside the organization. While some view these terms as different, for the purpose of this paper, we will use interdisciplinary or cross-functional teams to denote teams that include members from different departments in the organization, members from other organizations, or from different disciplines. For example, teams may include not only engineers and designers, but also representatives of the consumer, sales and marketing, production, and distribution. Each of these individuals would have a different point of view, relevant information, knowledge, and expertise that would be important to consider in developing solutions. The use of cross-functional teams has increased as organizations have realized the advantages of using teams for creative endeavors; however, the use of such teams is not without problems.[6] The purpose of this paper is to discuss the cognitive or thought processes identified in the study of creativity in the psychology and management literature and how these operate in a team, especially a cross-functional team environment. Additionally, we will discuss how these processes can be used to alleviate some of the challenges faced by cross-functional teams. The study of creativity and innovation is fragmented, and is covered by psychologists, management researchers, design and engineering researchers, as well as other fields (humanities, science). The goal here is to provide an overview of the research on team creative cognition, a topic that is usually not covered extensively in engineering and design.

Cognitive processes

In the psychological and management literature, cognitive processes (such as processes for how memories form and then retrieved) are used to describe problem solving. Cognitive processes associated with creative problem solving have received much more attention at the individual level than at the team.[7] However, the current research suggests that these processes are critically important for team creativity and that the benefits associated with cross-functional teams can be realized when these cognitive processes are effectively carried out.[7] Multiple theoretical conceptualizations of these cognitive processes at the individual level relevant to creative problem solving exist.[7–14] Several core processes can be identified that cut across these different conceptualization, including problem construction or problem identification, idea generation, and idea evaluation and selection. These three core processes have been identified as essential for team creative problem solving as well, and will be reviewed here.[7] A few points regarding these processes are noteworthy. First, most conceptualizations suggest that people and teams may cycle back to earlier processes, either routinely or as a result of difficulties encountered at a later process, so that the progression from one process to the next may not be linear. Second, the quality of the later processes may depend on the effort and quality of earlier processes, suggesting that all processes are critical for creative problem solving. Third, while some of these processes are viewed as typically more divergent (e.g., idea generation) and others as more convergent (e.g., idea evaluation), all of these processes contain elements of

divergent and convergent thought.[15] An overview of the positive, negative, and mixed factors associated with the core processes can be found in Table 1.

Problem construction

Many of the problems solved by cross-function teams are ill-defined or ambiguous, which means that they have multiple causes, multiple acceptable solutions, and that they are less structured than routine and well-defined problems.[16] In fact, it has been suggested that these ambiguous problems that contain technical, physical, and administrative contradictions are at the heart of creative problem solving for engineers and designers.[17] Therefore, theoretical conceptualizations depicting the creative process begin the act of 'creative thinking' by providing such structure to the problem in a cognitive process referred to as problem identification and construction.[7,17] Mumford et al.[18] describe the process of problem construction as an important cognitive process where individuals identify goals and desired outcomes to direct or guide problem-solving endeavors. In addition, and particularly relevant to engineering and design teams, constraints and restrictions (what cannot be done) are also identified. Such cognition creates a framework and structure that is particularly important when encountering ill-defined or ambiguous problems.[19] Indeed, very early research on problem construction has shown strong links between individuals' behavioral measures of problem construction ability and creative outcomes; these studies were conducted both in the field and with student samples, and evaluated naturally occurring problem construction ability.[19–21]

Mumford et al.[18] suggested that problem construction utilizes an individual's problem representation.[22,23] Problem representations are forms of knowledge resulting from the experience gained from previous problem-solving efforts and are used to frame the problem for future idea generation and eventual idea implementation. Knowledge and expertise play an important role in the development of creative ideas, and knowledge of design and engineering principles are a pre-requisite for effective application of these cognitive processes, especially the problem construction process.[24] Problem construction typically occurs automatically; however, when problems are novel, ill-defined, or complex, previous experience will not be sufficient and an effortful process of problem construction may occur.[18]

Much of the research on problem construction has been conducted at the individual level and found that experts approached problem construction differently, and more effectively, than novices.[25] Specifically, comparing experts and novices solving a problem using a think-aloud protocol, it was found that experts spend significantly more time structuring the problem and less time developing a solution compared to novices. Other work has found that effortful engagement in the problem construction process through instructions, ability, or training resulted in increased creativity. Basadur et al.[26] provided engineers with training in creative problem solving emphasizing problem identification and construction strategies while participants in other conditions either received placebo training or training in creative problem solving only. The resulting

analyses showed that those participants in the problem construction condition out-performed both participants who received placebo training and those who received training in creative problem solving only. Reiter Palmon et al. found that problem construction ability, as well as the quality and originality of the way the problem is constructed, were related to the creativity of the solution generated.[19,27]

Cronin and Weingart discussed problem representation as a team level phenomenon using two aspects. First, a joint representation within a team is viewed as the aggregate of all team members' problem representations. Second, a representational gap (rGap) which is the phenomenon that occurs when team members' individual representations are diverse and are not combined into a shared or joint representation. rGaps arise because each team member holds their own representations of the problem based on educational background, past experiences, expertise, and organizational function. As a result, rGaps are more likely to occur in cross-functional teams. Such inconsistencies are seldom integrated given representations are rarely verbalized in team settings.[28] Representational gaps may disrupt team agreement regarding a solution when they are not discussed and resolved.[28] However, research on representational gaps has not been conclusive in discerning whether rGaps have a positive or negative implications for creativity. Using product development teams that were studied over time, it was found that teams with larger rGaps tend to have difficulty during problem construction, leading to poor cognitive integration as a team and lower creativity.[29] However, other research on product development teams has suggested that larger rGaps may increase team creativity when teams identify the discrepancies early, and use them to communicate about alternative pathways to solving the problem.[30]

Similarly, research by Gish and Clausen[31] using a qualitative approach, examined problem construction in interdisciplinary teams comprised of individuals from different departments in product development teams. The departmental and domain differences resulted in different problem representations that were influenced by domain-specific pre-existing knowledge. Such differences in problem representations created team conflict and prevented idea integration.

Other work has sought to manipulate active engagement in problem construction by instructing teams to generate problem restatement prior to solving the problem, resulting in multiple and diverse ways to think about the problem. At the individual level, such instructions typically result in increased creativity of the solution.[32] However, the results for teams are less conclusive. Using student teams created for the purpose of the study, such instructions resulted in lowered creativity compared to teams that were just asked to solve the problem.[33] However, additional probing found that when more restatements were generated, the solutions were more creative. That is, effort in the problem construction phase was related to creativity—teams that generated more restatement and therefore exerted more effort developed more creative ideas. A second study utilizing a similar design found that there were no differences in the quality of

solution generated between teams that were asked to engage in problem construction to teams that were not.[34] However, marginal effects were found for originality. In this case, teams that were asked to restate the problem generated more original solutions. Further, these teams also reported more satisfaction with the process and lower levels of conflict.

Overall the limited research on problem construction suggests that individuals working in cross-functional teams are likely to have different representations of the problem based on their educational background, department, expertise, and past experiences. These differences can provide a basis for more creative solutions, but can also increase difficulties in communication and create conflict. However, teams that can manage the communication process and conflict more effectively tend to show improved problem construction and as a result increased creativity of the ideas generated. The approach for managing these differences has been focused on getting team members to discuss the way in which they construct the problem and recognize that these differences exist. Then, identifying ways in which these different problem constructions can be bridged or integrated. However, given the diverse findings, additional research evaluating this process in teams, and especially cross-functional teams is needed.

Idea generation

Idea generation is the process of coming up with alternative solutions to a problem. Ill-defined situations, those that foster creativity, are characterized by having multiple plausible solutions.[11,35] It is therefore not surprising that of all of the steps in the creative problem solving process, this is the step typically associated with creativity.[36] In fact, a common misconception about creativity is that it is simply the process of idea generation.[7]

The underlying assumption of using idea generation in cross-functional teams is that diverse teams would generate better and more creative ideas than individuals or homogeneous teams because of the diversity of information available to team members. Specifically, novel or original ideas would be generated as one idea would spark another idea, through group synergy, and that this effect would be particularly strong in interdisciplinary teams.[37] However, research has found inconclusive results, with some studies showing that diverse teams can develop more creative ideas,[38–41] and others finding lower creativity for diverse teams.[42,43]

One reason for these inconsistent findings is that sharing ideas and information has been found to be difficult, particularly when teams are diverse and individual members have different knowledge and information, which is typical of cross-functional teams. Studies suggest that shared information or ideas are more likely to be discussed, while information or ideas not available to all or most team members are less likely to be discussed.[44] As a result, teams may fail to capitalize on the diversity of knowledge and ideas. A study on the effect of functional diversity on team performance

in business unit management teams found that having a degree of overlap in experiences and functions between team members facilitated information-sharing and team performance.[45] Bunderson and Sutcliffe[45] argued that the overlap in information provides a common ground that facilitates information-sharing by allowing for easier communication.

Brainstorming has also been suggested as a way to address some of the concerns regarding sharing information and ideas. Brainstorming is a specific technique for the facilitation of idea generation in groups, emphasizes generating ideas while attempting to suspend evaluative thought, and has been the focus of many studies.[12,46] Most of the research conducted on brainstorming has used quantity of solutions or ideas as the main variable of interest, and not the quality or creativity of ideas.[47,48] Although the quantity of ideas may be of importance under certain circumstances, organizations do not usually care about number of ideas. Rather, what is important is to have ideas or solutions that work, that solve a problem or need, and that are novel. The focus on quantity provides an incomplete understanding of the effect of brainstorming on group creativity, and solutions or ideas must also be evaluated for quality and originality.

A review of the brainstorming literature suggests that in most cases, individuals working alone, or nominal groups (when individual output is pooled), outperform groups in terms of the number of ideas generated.[48–52] However, research on the effects of brainstorming on quality or originality of ideas is more limited and not as conclusive.[48,50,53,54]

Research has attempted to address the reasons for the unexpected lack of superiority by groups compared to individuals. One concern with using teams for any task is that there is often a pattern of nonparticipation. This tendency may be due to members being reluctant to share ideas with others, or having evaluation apprehension (e.g., social anxiety). Some group members, in an attempt to be polite, may wait and take turns to express ideas. This may result in a twofold loss of ideas; the person waiting may lose track of the idea, and because the idea was not shared it will not spark any other ideas from other team members.

One approach that has been suggested to improve idea sharing and remove some effects of production loss is using electronic brainstorming tools.[55,56] One way electronic brainstorming has been found to be beneficial is by allowing team members to simultaneously introduce ideas without having to wait. Electronic brainstorming has been found to be particularly effective for tasks requiring divergent thought.[57] Electronic brainstorming tools also allow for introducing ideas anonymously, which reduces evaluation apprehension, resulting in sharing of ideas particularly if individuals are diverse and are unsure about how their ideas will be received.[57]

Other approaches have been suggested to overcome design fixation[58] to facilitate idea generation. Design fixation occurs when designers are limiting the way in

which they explore solutions to the problem. Many design tools have been suggested to overcome design fixation, such as design methodology[59] using analogies[22,23] c-Sketch[61] or interruptions[62] Cross-functional teams are viewed as another way to reduce design fixation. As design fixation stems from knowledge and past experience, working in a team composed of members with a variety of backgrounds and experiences can alleviate this fixation.[62]

While differences between team members may make sharing ideas more difficult, cross-functional teams may have some advantages as well. De Dreu and West[63] suggested that when diverse groups share information and task-relevant knowledge, they have a higher opportunity to integrate their possibly conflicting viewpoints, avoid design fixation, and to generate more creative ideas. Tadmor et al.[64] found that diversity of experience as a result of multicultural experiences contributed to improved creativity in idea generation of dyads. Additionally, differences may become less pronounced or have less of an effect over time, as team members become more familiar with one another. Levine et al.[65] found that after 10 weeks of working together, teams outperformed teams in which members were not familiar with one another. Finally, in a diverse group there is a greater likelihood for at least one member to have familiarity with the problem. This expertise can facilitate coming up with new ideas, but also in terms of avoiding costly mistakes.[66]

Overall, the research on idea generation in groups, especially diverse groups, provides mixed results. Some studies suggest that teams are no better than individuals, and that in fact, idea generation in diverse teams is even worse. Other studies suggest that diverse teams can be more creative than individuals or homogenous teams. Determining when and under what conditions diverse teams can be successful at generating creative ideas is therefore important. Based on the research reviewed, a number of conditions that facilitate creative idea generation in teams have been identified. First, the metric by which creativity is evaluated is important. If the focus is on quantity alone, or number of ideas generated, teams may indeed function at a lower level.[48] However, if other measures of creativity are evaluated such as novelty or quality of the idea, then teams are more likely to be effective.[57] Given that organizations are interested in the creativity of an idea (one that is high quality and high originality), it seems that teams indeed can be beneficial under certain circumstances. Therefore, it is important to identify when cross-functional teams perform better than individuals. Second, teams will be able to capitalize on their diversity if team members are able to share ideas. The conditions that make sharing more likely include social processes such as developing trust in the team, providing support from leaders and team members for idea sharing and novel ideas, and creating a climate in which team members feel comfortable sharing unique ideas.[8] In addition, diversity in teams may lead to conflict and misunderstanding. How teams manage such conflict is important. Teams in which conflict is focused on the task, rather than interpersonal, and in which conflict is viewed as a way to address potential deficiencies in a solution (so as a positive), and where conflict is kept to a moderate amount, are more likely to be successful in using conflict

to bolster creativity.[60] Third, it would be useful to train individuals in teams on how to work in diverse groups, why diversity may be beneficial, and effective contribution to idea generation. In fact, Baruah and Paulus[67] found that trained teams generated more ideas and more creative ideas compared to nontrained groups that just practiced idea generation. The previous points underscore the importance of socioemotional factors, which have not been reviewed here, but are critical for effective team functioning, including for creativity. Finally, electronic brainstorming shows promise in avoiding some of the pitfalls associated with interactive or face to face groups such as needing to wait turns, evaluation apprehension, and can facilitate trust.[68]

Idea evaluation and selection

While idea evaluation did not receive as much attention as idea generation, it is no less critical for creative problem solving. In organizational settings, many ideas are generated, but only a few reach the implementation phase.[69] In addition, for design and engineering teams, idea selection is particularly important, as choosing the wrong idea to implement can be costly.[70] Further, the quality and originality of the final idea selected for implementation will depend on the quality of the evaluation and selection process. When presented with multiple options, teams do not always select the best one, so understanding the factors that facilitate the evaluation and choice of a creative solution is important.[70,71] It has been suggested that diverse teams may provide the most benefit to the creative problem solving process in the later stages of the creative process, namely, idea evaluation and selection and implementation.[72–75] This is because diverse teams can bring to bear different perspectives and expertise when evaluating ideas. Diverse team members will be able to critically think and analyze ideas from the different perspectives available to them, based on their domain of expertise, and therefore provide a more accurate evaluation of the idea, leading to a better choice.

Early work on team idea evaluation and selection has focused on comparing nominal groups with interactive groups.[76–79] Some of these studies found that nominal groups generated more ideas, and selected more original ideas, than interactive groups, whereas interactive groups selected more feasible ideas.[71] Girotra et al.[77] evaluated the use of different approaches to idea generation and selection and found that when team members worked alone and then in teams, they generated more and better ideas, and select better ideas, compared to teams that worked together for the entire experiment. Rietzschel et al.[79] studied both idea generation and idea evaluation in lab teams, and found that nominal groups generate more ideas and more original ideas than interactive groups. However, interactive groups generated more feasible ideas. However, there were no differences between nominal and interactive groups in terms of idea selection.

Given these inconsistent findings, research has focused on uncovering the reasons why teams are not performing better than individuals, and identifying ways to mitigate these issues. One important issue to understand was whether teams have difficulty in evaluating ideas in an accurate manner, or in choosing or selecting creative ideas. In a study designed to understand the relationship between evaluation accuracy

and idea selection, Kennel and Reiter-Palmon[71] asked teams in the lab to evaluate ideas that were previously evaluated by experts for quality and originality. Teams that more accurately evaluated the quality of the set of solutions chose ideas of higher quality to solve the problem, whereas teams that more accurately evaluated the originality of the set of solutions chose ideas of higher creativity (i.e., originality *and* quality). This indicates that teams that can evaluate more accurately the quality and originality of ideas are more likely to choose ideas that are of high quality or are creative. However, teams did not always evaluate ideas very accurately, and did not always select the best ideas out of those presented. Only 55% of the teams selected high quality or creative ideas. The other teams chose ideas that they evaluated as being good but were of low or moderate quality as assessed by experts.

At the individual level, research suggests that people have a preference for routine, low risk, and useful ideas, and that they tend to underestimate how creative ideas are.[80,81] However, work on this issue in teams is limited. As noted by Kennel and Reiter-Palmon,[79] even when teams are asked to select creative ideas, they tend to choose routine, noncreative, but high quality ideas, almost as often as they choose creative ideas. Similarly, Toh and Miller[70] found that attitudes toward risk was important in selecting creative ideas in design teams, and that teams usually preferred less risky, and therefore less creative, ideas.

Other research sought to understand ways in which we can facilitate the effective application of idea evaluation and selection so that ideas would be evaluated more accurately, and a creative solution would be selected. One way in which this can be accomplished is through providing additional guidance and structure during the process. Reiter-Palmon et al.[82] evaluated the effect of guidance and structure during idea evaluation separately from idea selection. During idea evaluation, teams were either provided a detailed rubric to facilitate the evaluation of quality and originality evaluation or were just provided definitions. During the selection phase, teams were either asked to select their best idea or to first select their top five ideas and then choose the best one. Using a rubric to evaluate solutions resulted in selecting a solution of higher originality. There was also an interaction between structure for evaluation and selection. When teams were provided with structure for both, more original ideas were selected. When teams were given structure for selection but not evaluation, the least original solutions were selected. However, these structure effects were not found for quality. Given the tendency to favor quality over originality in both evaluation and selection, the ability to improve the selection of high originality solutions, without hurting quality, is important. In fact, in this study, over 75% of the teams selected ideas that were either high quality (but not original) or creative (high quality and high originality). This is compared to the findings by Kennel and Reiter-Palmon,[71] in which only 55% of the teams selected high quality or creative ideas. This comparison suggests that providing more structure at both the evaluation and selection phases may indeed benefit teams, allowing for the selection of better (and more creative) ideas. Further, it is possible that

the rubrics used and the narrowing of the pool of ideas, allowed teams to create a shared framework for discussing the merits of ideas.

Mumford et al.[73] evaluated the role of shared frames and priming on evaluation and selection of creative ideas. They found that the factors that influenced individual and group creativity were different. Individuals benefited from priming and generated more alternatives compared to the no-priming condition. This in turn was related to selecting a more creative solution. For groups, although priming led to the development of more alternatives, it did not necessarily lead to the selection of a more creative solution. Instead, groups benefited from having all individuals exposed to relevant training. Moreover, the group that had the shared frame due to training, but was not primed, outperformed all individuals and all other groups in the study. Mumford et al.[73] suggested that the reason groups perform better when fewer alternatives are available, was that time and coordination requirements are minimized. However, because fewer resources are used to review multiple alternatives, groups were able to fully elaborate and expand on the better, more optimal choices for the solution to be implemented. In addition, having a shared understanding or a shared mental model facilitates production and the selection of creative solutions in groups. These results further underscore the importance of having an appropriate and shared understanding of the problem, or a problem representation. In this context, a shared understanding of the problem representation also created a shared understanding of how to evaluate the solutions generated or standards, which in turn allowed the selection of the most creative solution.

Unfortunately, the research on idea evaluation and selection in teams is limited, and research on idea evaluation and selection in diverse or cross-functional teams is even more limited. Therefore, understanding the factors that influence it and can improve it are not fully defined, and additional research is needed. The current research does point out a number of important issues. First, teams as well as individuals have a tendency to prefer routine, noncreative ideas. These ideas involve less risk, so it is not surprising that this is the preference of teams. This tendency makes it more difficult for creative ideas to be selected for implementation, which is problematic when organizations are looking for creative ideas. Second, teams are not very accurate when evaluating ideas. This inaccuracy in evaluation may lead teams to choose ideas that are less than optimal, or less creative. In fact, teams tend to choose ideas that they believe are good ideas (high quality, or high on both quality and originality). However, those same ideas are not always truly the best ideas. While teams may not judge ideas accurately, it seems that providing guidance and training does help in facilitating better and more accurate evaluation and therefore allowing teams to choose more creative ideas.

Table 1. Overview of Core Processes.

	Positive factors	Negative factors	Mixed factors
Problem construct	• Interdisciplinary teams have more diverse representations to draw from—may increase creative outputs	• Domain differences foster team conflict and present representation integration	• rGaps foster task conflict • Successful navigation of task conflict is associated with higher levels of creativity • Task conflict can turn into relationship conflict • Generating problem restatements may increase or decrease creativity
Idea generation	• Diverse experiences result in enhanced creativity • Proper brainstorming techniques can overcome challenges	• Sharing information is difficult for diverse teams • Nonparticipation by members • Diversity can lead to conflict	• Diversity may facilitate or decrease novel idea generation
Idea evaluation and selection	• Providing structure to teams can aid in selecting and evaluating better ideas	• Teams do not always select the best ideas	

Conclusions

Interdisciplinary, or cross-functional, teams, including creative teams, are becoming a common feature in many organizations today.[83] However, these teams face unique challenges, more so than more homogeneous teams. However, the diversity that creates these challenges also provide a unique opportunity for increased creativity and innovation. Understanding how teams approach problem solving in general and creative problem solving in particular can provide an important way to improve creative problem solving in interdisciplinary teams. In this paper, we have reviewed three critical processes: Problem identification and construction, idea generation, and idea evaluation and selection.

Overall, the research on interdisciplinary teams and team diversity suggests that diverse teams may have potential for creativity, resulting from all three processes discussed. During problem construction individuals from different backgrounds and disciplines are likely to have very different problem representations, which may facilitate a more complex and complete understanding of the problem, but may breed conflict. However, the conflict may not necessarily be detrimental. If managed appropriately, constructive conflict can lead to integration of different perspectives, identifying flaws in the group's ideas, and lead to an overall better team output. Teams can bridge and integrate differing problem representations and potential by discussing the different goals and ways to construct the problem thus leading to increased creative performance.

During idea generation, team diversity may benefit the development of more creative ideas, as team members can provide unique and diverse viewpoints. However, teams have been shown to fail to capitalize on their diversity in knowledge and ideas. This phenomenon may be in part due to the observation that sharing information does not always happen in teams. Team members having a degree of overlap in experience may facilitate information-sharing by providing a common ground for communication,

which then can be used to leverage discussion of information that is new. Additionally, certain team dynamics phenomenon, such as evaluation apprehension, may degrade the quality of information sharing. Techniques to overcome these communication blocks include general group brainstorming, electronic brainstorming, and team training regarding the value of diversity. Additionally, design techniques can help team members overcome design fixedness. When social processes are effective and information and ideas are shared, team diversity can lead to a solution that is novel and original as well as useful.

Finally, during idea evaluation, diverse team members' different perspectives may provide for different ways to evaluate the solutions and they will be able to identify different and multiple obstacles for implementation. Research on team idea evaluation and selection has found that teams do not always evaluate ideas very accurately and tend to emphasize the quality of an idea over originality. Techniques shown to overcome this drawback include generating a rubric detailing the evaluation criteria for the team. This creates a shared framework the team can use to structure the evaluation and selection process, and integrate differing ideas and problem representations into the final idea selected.

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