Analogy as a Tool to Enhance Innovative Problem Solving

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Current advances in markets, technology, and information occur at an exponential rate and require adjustments at all levels of an organization. This is requiring industry veterans to "think outside the box." General Motors (GM) has tackled the problem of thinking innovatively by applying knowledge gained from the research in psychology to develop innovative problem solving workshops. Though relatively little empirical research has focused on the use of analogy to enhance creativity, quite a bit is known about the processes involved in analogical problem solving. Consequently, GM was able to use this knowledge to develop Cross Domain Analogical Analysis (CDAA) workshops.

In the workshops, participants receive detailed information about multiple source domains. They are encouraged to map between the source and target domains and to list any insights they have generated. A case study of this approach reveals that workshop participants generate multiple insights about the target domain. The greater the number of source domains to which a person has been exposed, the greater the number of solutions they generate to the target problem.

Of specific interest to the current study is the degree to which the methods used in the CDAA workshops can be investigated in a more controlled environment. Will university students taught to use analogical problem solving and given specific source domains with which to work perform similarly to industry veterans using the same technique? We will also be investigating the effect of conceptual distance between the source and target domains on the solutions generated. Based on the existing literature (Dahl & Moreau, 2002), we predict that conceptually distant source and target domains will result in more creative solutions to the target problem.

Methods

58 Oakland University students were taught how to engage in analogical problem solving. They were then provided with the source and target domains they were to use for analogical problem solving. The source domain was either "Mall parking", "Downtown parking" or "Amusement park." The target domain was always "the parking problem at Oakland University."

Participants were then asked to use the source domain to generate and describe as many solutions to the parking problem at Oakland University as possible.

Participants' responses were coded for the number of solutions generated, the practicality and creativity of those solutions, and the number of other source domains used during problem solving. Creativity and practicality were coded on a 10 point scale (10 indicating the greatest degree of creativity/practicality).

Results & Discussion

Similar to executive's performance using the CDAA methodology, participants taught to engage in analogical problem solving were able to generate many innovative solutions to the target problem. Participants generated an average of five solutions per person. 53% of the 114 solutions generated were unique (solutions generated by a single individual).

The number of source domains actually used during analogical problem solving was significantly correlated $r(57)=.34$, $p < .01$ with the number of solutions generated to the target problem. However, it was not significantly correlated with either the practicality or creativity of those solutions, $p > .05$.

Conceptual distance had a significant effect on creativity, $t(36)=2.64$, $p<.05$. Those using conceptually distant source and target domains generated significantly more creative solutions than those given moderately dissimilar source and target domains. Conceptual distance did not significantly affect any of the other variables in the study, $p > .05$.

In summary, the results indicate that training in analogical problem solving produces similar performance in both real-world and laboratory settings. Performance in both settings is affected similarly by the number of source domains used during problem solving and by the qualities of the source domain. This is noteworthy given the dissimilarity between the two problem solving environments.

The similarity in performance between the laboratory and business environments suggest that the empirical foundations upon which the CDAA workshops were based work well in an applied setting. It also suggests that certain techniques for enhancing creative problem solving can be investigated in a controlled laboratory environment and then applied with some success in the business environment.

References

Dahl, D.W. & Moreau, P. (2002). The influence and value of analogical thinking during new product ideation. Journal of Marketing Research, 39, 47-60.