2016 CREATIVITY CONCEPT SELECTION IN INDUSTRY: ONLINE SURVEY QUESTIONS

Thank you for agreeing to participate in this online survey about concept selection methods in design practice. The following questions seek to obtain basic information about your educational and professional background in order to gain valuable demographic information about our participants. These answers will only be used to describe our participants and will not be directly linked back to your responses. You may skip any questions that you do not wish to answer.

1. Can you please describe your educational background (degree(s) and areas of concentration(s)).
2. Can you please describe your professional design experience (e.g. company, position, design projects)?
3. How many years of professional design experience have you attained?
4. What would you say is your primary area of expertise (e.g., mechanical engineer, aerospace engineer, industrial designer, etc.)?
5. What is your current job title (we will only use this to describe the participants of the study, this will not be affiliated with your responses).

The following 4 questions ask about concept selection methods and techniques that are used in design practice. These questions will add to our understanding of concept selection methods in design practice and the factors that impact the adoption of formal concept selection techniques in industry.

1. Can you describe a recent or ongoing design project that you have worked on?
2. During this project, can you describe how you (or your design team) **selected** concepts to move on in the design process after you generated concepts (i.e. what type of concept selection methods did you use, was it in a team or individually, did you have a say in what ideas moved forward, etc.)?
3. During this concept selection process, did you use any formal concept selection methods (e.g. Pugh's concept evaluation, voting, Analytic Hierarchy Process, or any variants)?
4. Was the process used during the design project described (concept development and selection) typical for you or your company? Why or why not?

Below is a list of formal concept selection methods that have been developed to increase the effectiveness of the concept selection process. For each one, rate your *familiarity* with each method (i.e. Do you know what it is?):

	Extremely familiar				Never heard of this before
	1	2	3	4	5
Pugh's Concept Evaluation Method	○	○	○	○	○
Analytic Hierarchy Process (AHP)	○	○	○	○	○
Quality Function Deployment (QFD)	○	○	○	○	○
Fuzzy Set Method	○	○	○	○	○
Utility Theory	○	○	○	○	○
'Plus-minus' Method	○	○	○	○	○
Multi-voting	○	○	○	○	○
Axiomatic Design Selection Method	○	○	○	○	○
Hypothetical Equivalents and Inequivalents Method (HEIM)	○	○	○	○	○
Go/ No Go Screening	○	○	○	○	○
Product Reaction Cards	○	○	○	○	○
Stage-Gate Product Innovation Process	○	○	○	○	○

1. Please list other formal concept selection methods that you know:
2. Describe if or how stage gate is utilized in your company. In addition, please describe who makes the decisions at the gates and what information or tools is used to inform these decisions?

For each of the concept selection methods listed above, please now rate your *perceived level of utility* of each method for use during the concept selection process.

	Extremely familiar				Never heard of this before
	1	2	3	4	5
Pugh's Concept Evaluation Method	○	○	○	○	○
Analytic Hierarchy Process (AHP)	○	○	○	○	○
Quality Function Deployment (QFD)	○	○	○	○	○
Fuzzy Set Method	○	○	○	○	○
Utility Theory	○	○	○	○	○
'Plus-minus' Method	○	○	○	○	○
Multi-Voting	○	○	○	○	○
Axiomatic Design Selection Method	○	○	○	○	○
Hypothetical Equivalents and Inequivalents Method (HEIM)	○	○	○	○	○
Go/ No Go Screening	○	○	○	○	○
Product Reaction Cards	○	○	○	○	○
Stage Gate Product Innovation Process	○	○	○	○	○

The following questions contain phrases describing people's behaviors. Please use the rating scale next to each phrase to describe how accurately each statement describes you. Describe yourself as you generally are now, not as you wish to be in the future. Describe yourself as you honestly see yourself, in relation to other people you know of the same sex as you are, and roughly your same age. So that you can describe yourself in an honest manner, your responses will be kept in absolute confidence. Please read each statement carefully, and then click the circle that corresponds to the accuracy of the statement. Note that this section refers to *individual* rather than *company* practices.

Please answer every item. Failing to answer items will result in an invalid returned score. All responses to this inventory from all respondents are completely confidential and will not be associated with you as an individual or your company.

	Very Inaccurate		Neither Accurate Nor Inaccurate		Very Accurate
I prefer creative designs over conventional designs	❍	❍	❍	❍	❍
I believe that creative designs will lead to positive design outcomes	❍	❍	❍	❍	❍
I prefer conventional designs over creative designs	❍	❍	❍	❍	❍
I am skeptical that creative designs will lead to positive design outcomes	❍	❍	❍	❍	❍
I focus on the strengths of a design concept more than the flaws of the design when making decisions	❍	❍	❍	❍	❍
I believe that someone who gives negative feedback is more intelligent and knowledgeable than someone who gives positive feedback	❍	❍	❍	❍	❍
I pay more attention to design flaws than design strengths in my decision-making	❍	❍	❍	❍	❍
I believe that someone who gives positive feedback is more intelligent and knowledgeable than someone who gives negative feedback	❍	❍	❍	❍	❍
I believe that risky design concepts will lead to positive design outcomes	❍	❍	❍	❍	❍
I believe that risky design concepts will lead to negative design outcomes	❍	❍	❍	❍	❍
I do not let my experiences with previous projects alter my perceptions and behaviors in future projects	❍	❍	❍	❍	❍
I use my experiences with previous projects to alter my perceptions and behaviors in future projects	❍	❍	❍	❍	❍
I am receptive to new ideas	❍	❍	❍	❍	❍
I will seriously consider novel ideas	❍	❍	❍	❍	❍
I am closed off to new ideas	❍	❍	❍	❍	❍
I disregard novel ideas	❍	❍	❍	❍	❍
I am tolerant of ambiguous or unknown information during the design process	❍	❍	❍	❍	❍
I embrace ambiguous or unknown elements in the early phases of design	❍	❍	❍	❍	❍
I have no need to maintain a sense of certainty during the design process	❍	❍	❍	❍	❍
I do not like dealing with ambiguous or unknown elements in the design process	❍	❍	❍	❍	❍
I seek to reduce ambiguous or unknown elements inherent in early phase design ideas	❍	❍	❍	❍	❍

	Very Inaccurate		Neither Accurate Nor Inaccurate		Very Accurate
I feel the need to maintain a sense of certainty during the design process	○	○	○	○	○
I try to find multiple solutions to a design problem	○	○	○	○	○
I believe that there are often multiple correct solutions to a design problem	○	○	○	○	○
I try to find a single solution to solve a design process	○	○	○	○	○
I believe that there is usually one correct answer to a design problem	○	○	○	○	○
I prefer taking risks during design projects	○	○	○	○	○
I avoid taking risks during design projects	○	○	○	○	○
In the past, I have tried to take risks during projects	○	○	○	○	○
In the past, I have tended to stay away from taking risks during projects	○	○	○	○	○
I tend to have a positive experience when taking risks during projects	○	○	○	○	○
I tend to have a negative experience when taking risks during projects	○	○	○	○	○
I am easily convinced that risky design concepts will be successful	○	○	○	○	○
I require proof or substantial evidence that a risky design concept will be successful before taking risks	○	○	○	○	○
I am confident in my ability to identify when ideas are creative	○	○	○	○	○
I am not confident in my ability to identify when ideas are creative	○	○	○	○	○
I believe that I am a creative individual	○	○	○	○	○
I tend to pay more attention to creative ideas	○	○	○	○	○
I tend to favor creative ideas	○	○	○	○	○
I intend to increase creativity during the design process	○	○	○	○	○
I do not believe that I am a creative individual	○	○	○	○	○
I tend to disregard creative ideas during design	○	○	○	○	○
I tend to not think highly of creative ideas	○	○	○	○	○
I am not focused on increasing creativity during the design process	○	○	○	○	○
I am comfortable with some failures during the design process	○	○	○	○	○
I often feel confused with conflicting design requirements	○	○	○	○	○
I am comfortable with conflicting design requirements	○	○	○	○	○
I believe that I generate valuable ideas	○	○	○	○	○
I am not comfortable with failure during the design process	○	○	○	○	○
I am seldom confused or lost while tackling a design problem	○	○	○	○	○
I am not comfortable with conflicting design requirements	○	○	○	○	○
I believe that I do not generate valuable ideas	○	○	○	○	○
I am motivated to solve design problems	○	○	○	○	○
It is easy for me to stay focused on the task at hand during a design project	○	○	○	○	○
I feel personally invested in the success or failure of the outcomes in a design project	○	○	○	○	○

	Very Inaccurate		Neither Accurate Nor Inaccurate		Very Accurate
I am not motivated to solve design problems	○	○	○	○	○
It is hard for me to stay focused on the task at hand during design projects	○	○	○	○	○
I am not personally invested in the success or failure of the outcomes in a design project	○	○	○	○	○
I feel that my current working environment encourages and fosters creativity	○	○	○	○	○
I feel that my current working environment does not encourage or foster creativity	○	○	○	○	○
I am usually unaware of when I am being criticized	○	○	○	○	○
I am not easily discouraged when I am being criticized	○	○	○	○	○
I am usually aware of when I am being criticized	○	○	○	○	○
I am easily discouraged when I am being criticized	○	○	○	○	○
I feel comfortable presenting my ideas to my team members	○	○	○	○	○
I do not feel judged by my team members for my ideas and opinions	○	○	○	○	○
I do not feel comfortable presenting my ideas to my team members	○	○	○	○	○
I feel judged by my team members for my ideas and opinions	○	○	○	○	○
I have a competitive nature	○	○	○	○	○
I want to outperform others	○	○	○	○	○
I am not competitive	○	○	○	○	○
I do not feel the need to outperform others	○	○	○	○	○
I like to take ownership of my ideas and opinions	○	○	○	○	○
I tend to express my ideas freely	○	○	○	○	○
I tend to handle failure well	○	○	○	○	○
I prefer to submit my ideas anonymously	○	○	○	○	○
I am not comfortable expressing my ideas freely	○	○	○	○	○
I do not cope well with failure	○	○	○	○	○
I prefer to go against the grain	○	○	○	○	○
I often have unique ideas and opinions	○	○	○	○	○
I do not follow trends	○	○	○	○	○
I am not intimidated by other people's opinions of me	○	○	○	○	○
People's opinions of me seldom affect my own actions	○	○	○	○	○
I prefer to not go against the grain	○	○	○	○	○
I often have conventional ideas and opinions	○	○	○	○	○
I often follow trends	○	○	○	○	○
I am often intimidated by other people's opinions of me	○	○	○	○	○
People's opinions of me often affect my own actions	○	○	○	○	○
I want to impress my superiors (supervisor, instructor, professor, leaders)	○	○	○	○	○

	Very Inaccurate		Neither Accurate Nor Inaccurate		Very Accurate
I want to get good grades	○	○	○	○	○
It is not important for me to impress my superiors (supervisor, instructor, professor, leaders)	○	○	○	○	○
I do not care about getting good grades	○	○	○	○	○
I play a central role in teams that I am a part of	○	○	○	○	○
I believe that I influence the direction and progress of projects that I am a part of	○	○	○	○	○
I do not typically play a central role in teams that I am a part of	○	○	○	○	○
I believe that I have little impact on the direction and progress of projects that I am a part of	○	○	○	○	○
I am the life of the party	○	○	○	○	○
I talk to a lot of different people at parties	○	○	○	○	○
I keep in the background	○	○	○	○	○
I don't talk a lot	○	○	○	○	○
I sympathize with others' feelings	○	○	○	○	○
I feel others' emotions	○	○	○	○	○
I am not really interested in others	○	○	○	○	○
I am not interested in other people's problems	○	○	○	○	○
I get chores done right away	○	○	○	○	○
I like order	○	○	○	○	○
I often forget to put things back in their proper place	○	○	○	○	○
I make a mess of things	○	○	○	○	○
I have frequent mood swings	○	○	○	○	○
I get upset easily	○	○	○	○	○
I am relaxed most of the time	○	○	○	○	○
I seldom feel sad	○	○	○	○	○
I have a vivid imagination	○	○	○	○	○
I am not interested in abstract ideas	○	○	○	○	○
I have difficulty understanding abstract ideas	○	○	○	○	○
I do not have a good imagination	○	○	○	○	○

The following questions assess an individual's risk aversion level. Measuring and studying risk- taking in professional designers is important for understanding the factors that affect the perception and preference for creativity in engineering design industry.

Answer the following questions regarding hypothetical lottery scenarios by specifying whether you prefer a varying payoff of a specified value, or a gamble of **fair odds** with a certain payoff of a specified value (i.e., you are *equally likely* to win the gamble or lose the gamble).

Which do you prefer?
○ $50 for sure
○ A fair coin flip in which you get $200 if it is heads, $0 if it is tails.

Which do you prefer?
○ $60 for sure
○ A fair coin flip in which you get $200 if it is heads, $0 if it is tails.

Which do you prefer?
○ $70 for sure
○ A fair coin flip in which you get $200 if it is heads, $0 if it is tails.

Which do you prefer?
○ $80 for sure
○ A fair coin flip in which you get $200 if it is heads, $0 if it is tails.

Which do you prefer?
○ $90 for sure
○ A fair coin flip in which you get $200 if it is heads, $0 if it is tails.

Which do you prefer?
○ $100 for sure
○ A fair coin flip in which you get $200 if it is heads, $0 if it is tails.

Which do you prefer?
○ $110 for sure
○ A fair coin flip in which you get $200 if it is heads, $0 if it is tails.

Which do you prefer?
○ $120 for sure
○ A fair coin flip in which you get $200 if it is heads, $0 if it is tails.

Which do you prefer?
○ $130 for sure
○ A fair coin flip in which you get $200 if it is heads, $0 if it is tails.

Which do you prefer?
○ $140 for sure
○ A fair coin flip in which you get $200 if it is heads, $0 if it is tails.

The following questions assess an individual's ambiguity aversion level. Measuring and studying attitudes towards ambiguity in professional designers is important for understanding the factors that affect the perception and preference for creativity in engineering design industry.

Answer the following questions regarding hypothetical lottery scenarios by specifying whether you prefer a fixed payoff of a specified value, or a gamble of ***unknown odds*** with an uncertain payoff of a specified value (i.e., it is *not known* how likely it is for you to win the gamble, as it could range from not at all likely, to extremely likely).

Which do you prefer?
○ $50 for sure
○ $200 if you win the gamble with unknown probability and $0 if you do not.

Which do you prefer?
○ $60 for sure
○ $200 if you win the gamble with unknown probability and $0 if you do not.

Which do you prefer?
○ $70 for sure
○ $200 if you win the gamble with unknown probability and $0 if you do not.

Which do you prefer?
○ $80 for sure
○ $200 if you win the gamble with unknown probability and $0 if you do not.

Which do you prefer?
○ $90 for sure
○ $200 if you win the gamble with unknown probability and $0 if you do not.

Which do you prefer?
○ $100 for sure
○ $200 if you win the gamble with unknown probability and $0 if you do not.

Which do you prefer?
○ $110 for sure
○ $200 if you win the gamble with unknown probability and $0 if you do not.

Which do you prefer?
○ $120 for sure
○ $200 if you win the gamble with unknown probability and $0 if you do not.

Which do you prefer?
○ $130 for sure
○ $200 if you win the gamble with unknown probability and $0 if you do not.

Which do you prefer?
○ $140 for sure
○ $200 if you win the gamble with unknown probability and $0 if you do not.