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YESict

Contribution – Output 10

Creativity Assessment for Students

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INTRODUCTION

The main aim of YESict experimentation was to unleash creativity potential of students, which calls for the question on how one can measure it and if the intervention designed had an impact on it. The main goal of this work is to refer to the literature, identify frameworks for measuring creativity, modify them to align them with the target group of the YESict project and use the resulting instrument before and after interventions.

According to Kumar (1997) creativity is considered coupled with the context in which individuals are interacting or the teams they form and in which they work. It must be emphasized, however, aspects of creativity should not be visualized as a pillar that is distinct and independent from the others, but rather as spheres that overlap and interact. Namely, creativity is a complex set of mutually influencing factors that cannot be dissected into discreet units. It is stated very frequently, that there is also a difference between creativity and innovation. In organizations creativity is often described as the 'fuzzy front end' whereas innovation is the area where ideas are turned into projects with people, budget and resources to make it happen. Creativity is the pre-innovation phase where there is just the brain that is working and where freedom is the major indicator. Innovation is the phase in which ideas are turned into new products, machines and/or services and where money and time start to be the major indicators.

In light of this, a definition for creativity certainly entails the potential it carries for new, unusual, original and different, ways to solve a non-trivial problem. However, generation of ideas is seldom enough; the idea generator needs to undertake action (often in the face of adversity) to overcome obstacles and risks to implement it. IN the literature, there are many definitions of creativity; Gasperz says that creativity is the quality of individuals or groups of individuals that leads to new expressions, new ways of seeing and new ideas. Koestler described creativity as bi-sociation: the moment at which one has a sudden insight into a problem-solving connection between two references that were not linked before. Latour (science anthropologist) describes creativity as the sociological ability to transfer the current and known order by creating new surprising links. According to Kumar (1997) creativity entails the following 8 intertwined aspects:

1. Measuring creativity of the contextual organizational group
2. Measuring Idea Management
3. Measuring results of Problem Solving sessions
4. Measuring creativity in teams
5. Measuring creativity of individuals
6. Measuring creativity of ideas
7. Measuring the number of available sources of ideas
8. Measuring the levels of emotions

Why these eight levels?

The reason stated is that they follow a flow starting from the individual human emotions of fear for dangerous situations; going into sources where the individual finds information he/she needs to generate creative ideas to solve the problems. If individuals can be creative, how about the creativity of teams, and what happens if you put people together in a Problem Solving session; what will the session deliver? And one step further; what happens with the output of ideas when they are put in an Idea Management system and how does the entire organization responds to creativity? The flow might as well be vice versa, starting with the organization.

The eight aspects reflected in the questionnaire do not trace creativity in an exhaustive manner, but they provide a basis for exploring the contributing factors towards creativity, the ways to measure it and upon its measurements, indication on ways to improve it.

Out of the eight aspects, the first one focuses on creativity overall and more specific the way in which the team perceives creativity in their environment. The second aspect refers to Idea Management system, which with a varying degree of sophistication (from software programmes to paper idea boxes) aim to capture ideas of employees, to assess those that seem more promising to derive new innovative product or services.

Creative Problem Solving sessions are a well-known tool to simulate the creativity and idea generation to solve problems. With regards to measuring creativity in teams, relevant topics include the influence of diversity and group effectiveness on the output of creative teamwork: the effect of diversity and of group work. Yet another level of measuring creativity is at the level of ideas. Measuring the creativity of ideas is however not straightforward, but a way to measure this is to see how many unique ideas are generated in each session. It should be underlined that creative ideas do not appear out of the blue.

People need interesting stimuli and enticing, triggering information to lead participants towards generating new and innovative ideas. Creativity and emotions are very much linked. Emotions like confidence, feeling comfortable, happiness, trust, share, safe, common ground, respect and connection are all important in connection to creativity for two seemingly conflicting reasons: i) Creativity is all about taking risks and ii) Creativity is all about trust.

Let us elaborate on it, further. One only dares to take risks if one knows that one can trust that their team people will support them. Furthermore, creativity requires full openness towards each other to accept each other's ideas. If there is openness and trust between the participants of the session, the most daring, new and creative ideas can be expressed and the group will produce a flow of these ideas. Providing space and freedom to share ideas in an atmosphere of trust is the best ingredient for creativity. Finally, the idea generator ought to have enough passion to give the idea the necessary energy and persistence to really drive it forward.

In this section an introduction into different ways to look at creativity has been presented and initial ways to measure creativity have been outlined. It is understood that creativity is a complex set of parameters mutually influencing each other. Therefore it is necessary to use a complex set of measurements, as those derived from published research. Based on literature review, a validated instrument for measuring creativity in organization has been identified. Given the context that is of interest in the YESict project, this instrument needs to be modified to fit the purpose and the demographics of the target group. The as-is and the modified version of the instrument are found in the following two sections.

QUESTIONNAIRE FOR CREATIVITY

The questionnaire is based on the 8 scales framework as described in the previous section. All questions use a 5-point Likert scale with Strongly Agree(1), Agree(2), Unsure(3), Disagree (4) and Strongly Disagree (5). The questionnaire measures the extent to which one perceives herself/himself to be creative. Higher scores on the scale are reflective of higher perceived creativity. The questions are listed as follows and a description of the different perceived qualities measured are explained at the end of the section.

1. I consider myself to be a creative person.
2. I am engaged in creative type work on a regular basis.
3. Creative ideas simply occur to me without even thinking about them.
4. I typically wait for a flash of inspiration before I begin working.
5. I would describe my style of creativity as erratic or nonsystematic.
6. I have had insights, the sources of which I am unable to explain or understand.
7. I believe in unconscious processes that facilitate my creative work.
8. In my work there are often long gaps during which I have no motivation.
9. I have been able to use many ideas for creative work that have occurred in my dreams.
10. I must be emotionally moved in order to be creative.
11. I have to be in the right mood or feeling to do creative work.
12. When I get a new idea, I get totally absorbed by it until I have pursued it completely.
13. I feel that new ideas possess me and guide my thought to completion almost automatically.
14. I believe that creativity comes from hard work and persistence.
15. My creativity comes from careful planning and forethought.
16. I practice to be creative.
17. My creativity comes from self-discipline.
18. I attribute my creativity to divine inspiration.
19. I tend to lose my sense of time when I am engaged in creative work.
20. I keep a pen/notepad/tape recorder handy to record new ideas as they occur.
21. I often let my mind wander to come up with new ideas.
22. I typically create new ideas by systematically modifying (by substituting, rearranging, elaborating, etc.) an existing idea.
23. I typically create new ideas by combining existing ideas.
24. When I examine existing products, I usually critically evaluate them to see how I can improve them.
25. I have often gone back to ideas that I have rejected before.
26. I am always thinking (fantasizing) about how to do everyday things differently.
27. I typically modify an existing idea only slightly, one step at a time.
28. I deliberately reject or ignore conventional or already accepted ideas to come up with new ideas.
29. I often look for new ideas outside of my own field, and try to apply them to my own.
30. I tend to work on many ideas simultaneously.
31. I often use the technique of brainstorming to come up with new ideas.
32. I have maintained a notebook/diary of new ideas that I would like to pursue someday.

33. When I am generating new ideas, I do not tend to evaluate them until I have generated my idea.
34. I do a lot of experimentation (trial and error) to come up with a new workable idea.
35. When I get stuck, I tend to leave the idea for a while, do something else, before returning to work on it.
36. I take walks to come up with new ideas.
37. I read widely to come up with new ideas.
38. When I have a new idea, I tend to discuss it with someone to determine its potential for success.
39. When I get struck, I consult or talk with other people about how to proceed.
40. I am at my creative best when I work alone.
41. I am at my creative best when I work with one other person.
42. I am at my creative best when I work in a group.
43. I am secretive about my new ideas.
44. I typically show my creative products to other people.
45. I physically isolate myself from other people when I am working on creative ideas.
46. I physically isolate myself from other people to come up with new ideas.
47. I have often pursued bad or unworkable ideas for a long time.
48. I usually have a lot of both workable and unworkable ideas.
49. I work most creatively when I have deadlines.
50. If I do not have a concrete (visible) creative product to show (e.g., written composition, work of art or music, etc.), then I think I have failed.
51. I enjoy the process of creating new ideas whether they lead to a final product or not.
52. When I have completed a creative product, I am unable to start on a project for a long time.
53. I think a final product that is not readily observable thought the senses can emerge in a creative act.
54. I have set aside a particular place (or places) for creative work.
55. I have set aside a particular time (or times) for creative work.
56. I have a particular place (or places) where I do most of my creative thinking.
57. I have a particular time (or times) during the day when I do my creative thinking.
58. I tend to smoke (cigarette, pipe, cigar) before beginning creative work.
59. I tend to drink tea/ coffee/other drinks with caffeine before beginning creative work.
60. I tend to smoke frequently when engaged in creative work.
61. I tend to drink a lot of tea/coffee/other drinks with caffeine when engaged in creative work.
62. I ordinarily smoke after I have worked on my creative idea(s) for a designated period of time.
63. I ordinarily drink tea/coffee/other drinks with caffeine after I have worked on my creative ideas for a designated period of time.
64. I reward myself in some way after I have worked on my creative idea(s) for a designated period of time.
65. I tend to do my creative work in a quiet place.
66. I typically have background music when I am engaged in creative work.
67. I use alcohol to get into a mood for creative work.
68. I use mind altering substances (other than alcohol) to get into a creative work.
69. I typically start my creative work with a prayer.
70. I typically meditate before I begin my creative work.
71. I tend to snack when I am engaged in creative work.

- 72. I have a favorite tool (a certain pen/easel/thinking cap, etc.) without which I would find it hard to concentrate when I am engaged in creative work.
- 73. I have a favorite amulet or clothing that I wear when I am engaged in creative work.
- 74. I tend to use my visual sense a lot in my creative work.
- 75. I tend to use my sense of hearing a lot in my creative work.
- 76. I tend to use my sense of touch a lot in my creative work.
- 77. I tend to use my sense of taste a lot in my creative work.
- 78. I tend to use my sense of smell a lot in my creative work.

The aforementioned questionnaire measures aspects through different questions, as shown in the Table 1, below.

Table 1. Construct and questions in the original questionnaire

Scales Measured	Relevant Questions
Creativity Capacity	1, 2
Belief in Unconscious Processes	3-13 (reversed), 14-19
Use of Techniques	20-37
Use of Other People	38-46
Final Product Orientation	47-53
Environmental Control	54-71
Superstition	72-73
Use of the Senses	74-78

The various scales measured are briefly described in the sequence. Creativity capacity measures the extent to which a person perceives themselves to be creative. Higher scores on the scale signify a higher perceived creativity.

Belief in unconscious processes measure the extent to which a person believes in the creative process as insightful and inspirational over which there is little personal control. Higher scores on the scale indicate greater belief in unconscious process as a significant driver to creative work. Questions 3-13 need to be reversed i.e. Strongly Agree (5), Agree (4), Unsure (3), Disagree (2) and Strongly Disagree (1).

Use of Techniques measures the extent to which a person uses specific strategies or techniques to facilitate their creative work. Higher scores reflect greater use of different techniques. A person's score is derived by adding the rating on the following 18 items and dividing by 18.

Use of Other People reflects the extent to which a person consults other people, work with other people, or share ideas or creative products with other people. Higher scores indicate higher use of other people. Higher scores indicate higher connectivity with other people. A person's score is derived by adding the ratings of the items and divide them by 9.

Final Product Orientation reflects the extent to which people are motivated to engage in creative work by the development of a final product. Higher scores reflect a higher a higher product orientation. A person's score is derived by adding the relevant ratings and divide them by their number.

Environmental Control measures the extent to which a person sets up discriminative stimuli to self-regulate or facilitate his/her creative work. Higher scores indicate a person setting up more discriminative stimuli to facilitate his/her creative work. A person's score is derived as the average of the answers of the 18 items.

Superstition measure the extent to which a person engages in superstitious behavior and is measured as the average of the answers to the relevant questions.

Use of senses measure the extent to which a person uses the five senses to support creative work and it calculated by finding the average of the relevant answers.

From the above and the questions involved it is evident that the questionnaire although is a holistic approach to measure creativity aspects, it is not directly applicable for our target group, as it is very long, it contains certain questions inappropriate for the age group involved and the language is formal. For that, a modified questionnaire is suggested that keeps the same constructs with fewer question per construct and overall resulting into a more compact version. It is understood that reliability for each construct may be diminished but given the original values that were high, it is considered a compromise we can undertake.

UPDATED QUESTIONNAIRE FOR CREATIVITY

The questionnaire is based on the 8 scales framework as the original. All questions use a 5-point Likert scale with Strongly Agree (1), Agree (2), Unsure (3), Disagree (4) and Strongly Disagree (5). The questions are listed as follows and a description of the different perceived qualities measured are explained at the end of the section. Before we proceed with the questionnaire, we include the Table 2 with the modified groups of questions keeping the initial numbering style.

Table 2. Construct and questions in the interim questionnaire

Scales Measured	Relevant Questions
Creativity Capacity	1, 2
Belief in Unconscious Processes	3, 6, 9, 11, 12, (reversed); 16, 19
Use of Techniques	20, 22, 24, 32-37
Use of Other People	39-43
Final Product Orientation	49, 52, 53
Environmental Control	56, 57, 64, 66, 71
Superstition	72-73
Use of the Senses	74-78

The next stage of our modification involved rephrasing (whenever necessary) the questions to make more appealing/relevant to the language and habits of youth today. We also renumbered the questions. The final questionnaire is found below and Table 3 holds the correlation of the questions in the new sequence with the constructs proposed by the questionnaire.

1. I believe I am creative.
2. I work creatively regularly.
3. Creative ideas come to my mind out of the blue.
4. I have had insights that I cannot tell how I got them.
5. I have ideas in my dreams that let me do creative work.
6. I have to be in the right mood to do creative work.
7. When I get a new idea, I am totally into it until I am done with that.
8. I practice to be creative.
9. Time flies, when I do creative work.
10. I keep a notebook/smart phone/pen handy to take notice of new ideas as they occur.
11. I make new ideas by systematically modifying an existing idea.
12. I typically create new ideas by combining existing ideas.
13. When I use a product, I usually examine it to see how I can improve it.
14. I have maintained a list of new ideas that I would like to develop in the future.
15. When I get stuck, I tend to leave the idea for a while, do something else, before returning to work on it.
16. I exercise to come up with new ideas.
17. I surf the Web/Social Media with new ideas.
18. When I get struck, I consult or talk with other people about how to move on.
19. I am very creative when I am alone.
20. I am very creative when I work with my buddy.
21. I am very creative when I work in a group.
22. I do not want to talk about my new ideas.
23. I am very creative when I have deadlines.
24. When I have completed a creative project, I need to wind down for a long time.
25. I believe creative work can also be in the form of something non- observable thought our senses.
26. I have a particular place (or places) where I like to do most of my creative thinking.
27. I have a particular time (or times) during the day when I like to do my creative thinking.
28. I reward myself every time I work on my creative idea(s) sufficiently long..
29. I tend to do my creative work in a quiet place.
30. I typically have background music when I am engaged in creative work.
31. I tend to snack when I am engaged in creative work.
32. I have a favorite tool (a certain pen/easel/thinking cap, etc.) without which I would find it hard to concentrate when I am engaged in creative work.
33. I have a favorite amulet or clothing that I wear when I am engaged in creative work.
34. I tend to use my visual sense a lot in my creative work.
35. I tend to use my sense of hearing a lot in my creative work.
36. I tend to use my sense of touch a lot in my creative work.
37. I tend to use my sense of taste a lot in my creative work.
38. I tend to use my sense of smell a lot in my creative work.

Table 3. Construct and questions in the final questionnaire

Scales Measured	Relevant Questions
Creativity Capacity	1, 2
Belief in Unconscious Processes	3-7 (reversed); 8, 9
Use of Techniques	10-17
Use of Other People	18-22
Final Product Orientation	23-25
Environmental Control	26-31
Superstition	32-33
Use of the Senses	34-38

As a final note, one needs to identify appropriate ways to administer the questionnaire to yesict participants. An element of gamification as brought forward by Kahoot! Platform will be usually appreciated.

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