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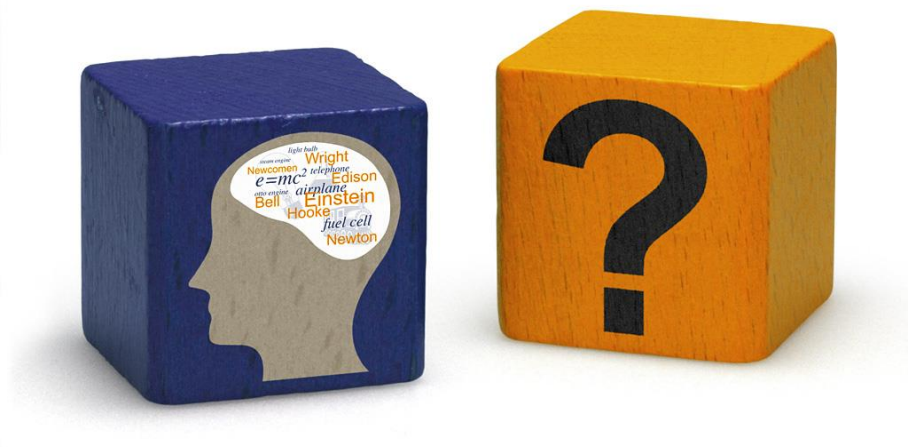
Identifying innovation: a new era of assessment

An interview with Dr Achim Preuss explaining the development of the sparks assessment of creativity



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Identifying innovation: a new era of assessment
An interview with Dr Achim Preuss

In this interview, Dr Preuss co-founder and Product Director of the *cut-e* Group explains why *cut-e* has sought to develop a new measure of innovation and creativity – and introduces the *sparks* assessment.

Dr Preuss has a business psychology background and a doctorate in applied computing science and, since beginning his career in 1989, has run successful HR consultancy and IT development projects for organisations including Beiersdorf, Credit Suisse, L'Oreal, 3M, and Siemens. His main areas of expertise include job analysis, knowledge engineering, and e-HR – demonstrating the value that online assessment and development solutions can bring – and has had numerous articles published in these areas.

sparks is a new assessment tool looking at creativity, developed by Dr Preuss and his team at *cut-e.* At *cut-e,* Achim is responsible for product development, the IT systems *cut-e* uses to deliver its online tools, and the network of technology partners with which *cut-e* works.

Q1. Innovation is a difficult concept to describe and define, and yet is clearly an important quality in many organisations. Why is innovation so important in today's organisations?
Yes, it is hard to define the concept and yet we know that innovation is one of the key factors that enable companies to gain competitive advantage. They may be seeking to improve a business process, a service or a product line, but to do any of these requires innovation and a new way of looking at things. And, to take this further, every innovative step requires people with the skills to create, define and articulate that innovation. We think that this holds true both for what is known as 'sustaining innovation' where many small improvements are made to something already developed, as well as for the so-called 'disruptive innovation' whereby, for example, an entirely new market for an entirely new product or service is created. I believe, therefore, that innovation is of central importance for the competitiveness of an organisation, but is also the key factor for the prosperity of an entire economy.

Q2. With such importance, how do you define 'innovation'? Is it the same as 'creativity'?
Innovation requires two factors being met: that it is a new idea, and that this new idea is useful – and, of course, this usefulness can only be proven by implementing the idea. Each problem solving process that leads to innovation, requires creativity. However, creativity doesn't require usefulness as a criterion – unlike innovation. And that, in essence, is the difference between innovation and creativity.

Our research shows that the innovation process generally takes place across four stages. It always starts by identifying a problem for which a specific solution is sought. In the next stage, different ideas for solving this problem are generated. Of course, sometimes these first two stages don't happen in order: sometimes ideas are floating around and only applied and seen to be of use once a specific, concrete problem which they can solve is identified. In the third stage, we start to look at how this idea is going to be implemented: different options or approaches are evaluated and a plan is made to implement the chosen approach. Finally, in the fourth phase, we start to communicate the ideas and how they will be put into practice and typically, this requires initiative, tenacity and networking with those with influence.

We believe that progress through these four stages may not be linear with stages overlapping and interacting and requires a variety of skills that are very rarely found within one person, thereby highlighting the importance of bringing together teams of people with the right abilities to see this process through.

Creativity is a central element to this innovation process – although often overlooked when bringing together a team. Not only is creativity the essential ability for the generation and communication of ideas, but is also important when identifying problems; without this, sometimes only the very obvious or irrelevant problems are identified.

Q3. With such importance, how has creativity been measured or assessed in the past?
Initial research by the psychologist Guilford in the 1950's suggested that creativity works differently from logical reasoning and so is an independent factor of intelligence. Typically, cognitive tests are built around the presentation of a 'closed problem' – that is, a question or a problem is presented for which a correct answer exists. Of course this approach goes completely against the concept of creativity where it's essential to 'think outside the box' and to leave an open space for creativity to take place.

One way to deal with this in a test of creativity is to include what is typically known as a 'business exercise' in which the test taker is presented with a practical business problem and then has the task to create as many different solutions as possible. This type of test works well in an assessment centre but is impractical in an unsupervised online assessment where answers to problems get shared between test takers almost as a matter of course via social media and the Internet in general. To avoid this happening, a constant supply of newly produced business exercises is needed, and this would mean that there would never ever be a standard test capable of offering benchmarks.

Another approach for measuring creativity is used in the Torrance Test of Creative Thinking (TTCT) based directly on the research of Guilford into divergent thinking. In this test, the test taker is asked to create images with given objects and to then give a name or title to these images; extensive research into this type of test suggests this comes close to the essence of creativity. The problem is that this test is also not suitable for unsupervised online administration and, as with the business exercise approach, needs to be manually scored by those expert in these tests. This makes them impractical when faced with many test papers to mark and likely to be far from objective based on psychometric criteria.

Q4. Why did *cut-e* look to develop an assessment of creativity now and to be the first to market such a tool?
We've witnessed the general growth in the recognition of the importance of creativity – and our customers have been asking us how to identify this for a while. As with the general trend in assessment, they're looking to measure effectively and objectively – and they want this to be through unsupervised and online administration with a fully automated scoring.

Q5. What challenges does online assessment delivery bring to tests of creativity and innovation? How were these overcome?
Quite frankly, at the outset of our research, I was not quite sure that it was possible to design and develop an online test which was capable of being scored instantly and accurately and one that didn't leave itself open to being shared between test takers thereby invalidating the results.

We experimented with different formats of such a test for quite some time and they all proved to be unsuccessful and none of those formats seemed as promising as the basic model of the Torrance test. We then redefined the problem by asking ourselves: would it be possible to construct an artificial intelligence that simulates an experienced expert who can score a Torrance test in less than a second? This approach brought the solution.

After we demonstrated empirically that this approach works in principle, we redesigned the input of the test completely so that it became suitable for unsupervised, online implementation. This means that it had to be independent of drawings skills, independent of language and free from the opportunity of creating 'best practice' solutions.

Q6. So, tell me more about *sparks.*
The test taker's task in *sparks* is to first of all produce images made up of different shapes and objects and to then give these images specific titles. It's a straightforward assessment and delivered online via computer and takes 15 minutes to complete.

The test taker finds, on each new canvas or screen, one or more line drawings of objects which, whilst can not be deleted, can be altered in size and positioning, and rotated. The test taker is asked to add other objects to those already on the screen to create an image – and to add a title to this image.

The test taker is required to generate as many different and original images as possible. Other than to create as many pictures as possible, there is no clear problem and therefore no clear solution.

Scoring is carried out by means of various artificial intelligent (AI) components that interact with each other and, in less than a second after test completion, the scores are available. To check that the image titles make sense and are acceptable, one of the AI components interfaces to Google. From the number of 'hits' for individual words and word combinations that Google delivers, the *sparks* AI component is able to derive, for all defined languages, an evaluation which is equivalent to that of an experienced expert.

sparks provides the test user with norm-based scores for the three factors of Fluency, Flexibility, Originality and also a Total Creativity score.

Q7. How have you been able to look at the reliability and validity of *sparks*?
When developing a test, the test-retest reliability for a measure repeated after 2 weeks should be above .7 for all factors for it to be deemed very good – and this is the case with *sparks.*

We were able to demonstrate the validity of *sparks* based on different criteria by comparing the results from *sparks* with those from the Torrance Test of Creative Thinking. The completed TTCT was initially scored by experienced experts and then compared with the fully automated scoring of *sparks*. The correlations for each of the factors between experts and *sparks* was found to be at least .8. This means that we can assume at least the same level of predictive validity by *sparks* as by the TTCT. The correlation between *sparks* and tests of abstract reasoning are low (.18) and this supports the theory that *sparks* is measuring divergent thinking. We are currently conducting further studies with different target groups in order to investigate the connections between *sparks* and 360 assessments that include facets of innovation.

Q8. What has been the reaction to *sparks* from those taking the test?
So far it's been very positive. We carried out an acceptance study in cooperation with the *Fresenius University of Applied Sciences* and the user interface of the test has been met with high praise from those taking part. It seems that there are no advantages for test takers who have prior experience with design or graphic software: our study showed those unaccustomed to graphics packages were no slower in progressing through the test than those who were already using such tools.

The test time of 15 minutes is quite a lengthy test for an unsupervised format but preliminary studies indicate that this time provides the optimum balance between efficiency and accuracy for *sparks*. The fact that there are no correct answers in the test has generated some initial uncertainty for test takers who are used to more closed assessments, but this has not been seen as unwelcome or awkward and in fact is often the initial reaction when faced with a personality test.

Q9. So how can *sparks* be used?
If *sparks* is being used in diagnostic decision-making – such as in selection situations - it's important that it isn't used in isolation. We offer *sparks* as part of our Innovation Suite.

The Innovation Suite combines *sparks* with a personality tool (*shapes*) and a test of abstract, logical thinking (*scales lst*). With these three instruments together, you're able to obtain a score across the four phases of the innovation process and a subscore for each of the 12 underlying competencies.

When *sparks* is used as part of the Innovation Suite, it helps companies wanting to look at screening in applicants for innovative potential and to build teams that, together, are likely to create innovations for the organisation.

Q10. And looking forward, how do you see *sparks* developing in the future?
There are a number of research projects with *sparks* underway.

One of the research questions is looking at the intercultural differences of creativity. With *sparks*, it is possible for the first time to test efficiently larger groups of people in different cultures and to analyse the results systematically.

Another aspect of our research programme and further development concerns the so-called 'para-data' of *sparks*. As a test taker interacts with *sparks*, all interactions are recorded and this produces Big Data on an intra-individual level. There are many indications to suggest that this type of process data provides additional valuable information about the test taker which can be used psychometrically to provide HR professionals with further decision-relevant information.

For more information about *sparks*, please visit our website www.cut-e.com

cut-e is world leader in the design and implementation of innovative online tests and questionnaires for recruitment, selection and development. *cut-e* helps companies identify people with the right capabilities and cultural fit to deliver optimal business results. *cut-e* carries out over 4 million assessments per year in over 70 countries and 40 languages.