OEINSIGHTS
Evidence, Analytics, Decisions

Building A Creative Mindset

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Contributors

Ayesha Siddiqua MSc PhD

Mohit Bhandari MD FRCSC PhD
Editor-in-Chief, OrthoEvidence

Insights

- Our creativity decreases as we get older – children are more creative than adults because they are not afraid to think outside the box, take risks, and try new ideas despite previous failures.
- The value of creative thinking is not limited to the arts – it is integral for driving innovation across all industries.
- There are many highly accomplished scientists and clinicians with a diversity of interests, which helped them prosper in their fields of practice by harnessing the power of creativity.
- Even though many aspects of healthcare are now moving towards increased standardization and regulation, creative thinking still remains integral for providing patient-centred care and driving future innovation.
- There is now evidence supporting creativity training programs and some medical schools are beginning to integrate these programs in their curriculum.
- Our acronym **I.N.N.O.V.A.T.I.O.N.** identifies a series of visions and actions needed to reignite your creative potential and turn your imagination into a reality.

> "As adults, we have the benefit of being able to exploit our existing knowledge as a shortcut to processing new information. Children need to take time to explore and discover. Creativity, however, is not about efficiency. While we can't get younger, we certainly can find creative ways to think like kids."
>
> **Rohini Venkatraman, 2020 (1)**

Nurturing the Creative Spirit: From Childhood to Adulthood

The role of creativity to push boundaries and excel in a diversity of careers is now increasingly recognized. Yet, there is significant research suggesting that creativity generally decreases as we age. Findings of a longitudinal study showed the following proportions of individuals who scored for creativity at different ages as they grew older: age 5 (98%), age 10 (30%), age 15 (12%) and adults (2%) (2). It has been found that as learners grow older, they are less likely to adopt an unfamiliar hypothesis that is consistent with new evidence when problem solving (3). Instead, older learners prefer to resort to a familiar hypothesis, even though it may be less consistent with the evidence in hand (3). One hypothesis for why creativity declines as we grow older proposes this is due to increasing knowledge (4). While existing knowledge can be certainly resourceful in many circumstances, it can also lead us to ignore evidence that challenges our prior understanding of a subject matter (4). As humans, we have the option to pursue two types of thinking, one based on exploration and the other based on exploitation (4). As adults face new problems, they tap into their pre-existing knowledge to come up with a solution (4). They are less likely to explore new ways of solving a problem that may not work, although children and teenagers have great inclination to take risks and try out new ideas with much enthusiasm (4). There is now general consensus that fostering creativity is at the heart of revolutionizing how we operate across all industries – keeping ourselves siloed in our usual social networks and ways of thinking can cause more harm than good in the long run. Reigniting the creative spirit within all of us will not only be liberating, but it will also bring much fulfillment and maximization of impact through all our endeavors.

> "Creativity is inventing, experimenting, growing, taking risks, breaking rules, making mistakes, and having fun"
>
> **Mary Lou Cook**
> Late Actress, Singer, and Dancer

> "People who are in creative professions develop personal systems to stay creative. They develop predictable habits that take them into unpredictable territory. This is a lifestyle choice to stay in the uncomfortable territory of the unknown. They may seek out people outside their profession, read random things, or force themselves to brainstorm whimsically. This systemization of creativity doesn't have the bizarre arc of childhood imagination, but does combine life experience with creativity in a way that can be more impactful (and higher paying) in modern society."
>
> **Paul King**
> Computational Neuroscientist, Former Director of Data Science at Quora (5)

> “For her entire career, Medicine Laureate May-Britt Moser has worked long hours. Throughout, however, she has remained relaxed – a state of mind she believes is key to her creativity.”
>
> **Nobel Media, 2020 (6)**

Creativity for An Exceptional Career

As adults grow older and progress through their career, there is a real temptation to keep working harder and for longer periods of time. Yet, this approach doesn't always lead to better outcomes and it is certainly not the recipe for an outstanding career. In our lecture, '5 Critical Habits To Think Bigger in Your Career', we emphasized the importance of prioritizing your '20% list'. In other words, those 20% of activities in our life that bring us 80% of our satisfaction. This list can look different for everyone, including diverse interests and hobbies. Successful scientists, as Root-Bernstein writes, “have highly integrated networks of enterprise, whereas their less successful colleagues tend to have fewer non-scientific activities” (7). Diversity in interests is more important than hyper-specialization – this notion does not only apply to scientists but any career. A look at the past Nobel laureates' lives provides testament to the importance of diversity of interests. Nobel laureates are known to look at problems differently and use creativity to not only solve existing problems, but also identify new frontiers in their respective fields (6). For example, Dr. May-Britt Moser, who received the 2014 Nobel Prize in Medicine, described how bringing out the child within her was important for propelling creativity in her work (6). Since childhood, she spent a lot of time playing and exploring outdoors. She had a particular interest in studying animals and observing them closely – such as the behaviour of snails as they ate – and questioning the reasons behind their actions. She maintained this curiosity and inquisitiveness throughout her career, which helped her take a creative approach to work.

Importantly, the value of reflection has been emphasized repeatedly to boost creativity. Dr. Paul Nurse, who received the 2001 Nobel Prize in Medicine, also advocates for taking time off, as it can help us think about things in different ways and take a creative approach to solving problems.

> “It takes a creative doctor to be able to individualize treatment and provide holistic care. Creativity and a willingness to question can also help doctors connect disparate ideas in medicine.”
>
> **Dr. Danielle Ofri**
>
> Associate Professor of Medicine at New York University School of Medicine, 2013 (8)

"While recognizing that not all fine physicians are musicians…the practice of medicine, like music, is essentially "performance"; that learning and teaching in both fields are best accomplished through coaching; that practice is as important as talent, or more so; that continual integration of practice into daily work and performance is essential; and that expertise in both disciplines results from innovation by individual practitioners that is built on a foundation of fluency with standard procedures [10]. Practice in the arts can help inculcate these values and hone these skills."

Wong, 2014 (9)

"The great paradox here is that the same reforms that are improving our current care may also be endangering our future health. As medicine has become more standardized and increasingly regulated, it turns out there is much less room for innovation. The spirited pursuit of the unknown—so long a defining quality of medicine—now seems seriously endangered. The new world of rapid throughput and endless documentation provides little time to reflect upon important clinical problems and consider fresh approaches. If anything, thinking about a patient or a question too much is now implicitly discouraged because it slows doctors down; contemplation is bad for productivity."

Shaywitz & Ausiello, 2004 (10)

Why Medicine Needs Creativity

Creativity has a strong history in medicine and has the potential to revolutionize this field of practice. In the past, creative doctors have played an integral role in discovering new diseases and developing new therapies (8). Below are some examples of clinicians who have immersed themselves in artistic endeavours, which in turn have translated to creativity in their approach to practicing medicine:

- Dr. Theodor Billroth: He was an influential surgeon who was among the first to develop a wide range of surgical procedures. He was also an accomplished pianist from an early age, and he later learned the viola and violin.

- Dr. Paul Kolker: He is a renowned cardiothoracic surgeon, contemporary artist, and attorney. He was an artist from a very young age, beginning oil paintings at 10 years of age.

- Dr. Joseph Gascho: He is an accomplished cardiologist and an avid photographer, who uses this art to present his patients and his fellow healthcare colleagues as human beings.

- Dr. Sandra Block: She is a well acclaimed neurologist who is also a fiction novel writer, focusing largely on the suspense genre.

Additionally, the need to practice creativity in providing patient-centred care was also introduced long ago by pioneers in medicine, such as Sir William Osler. He famously quoted that 'It is much more important to know what sort of patient has a disease than what sort of disease a patient has' – highlighting the need to look beyond structured diagnostic and treatment strategies as necessary.

Clinicians, as front-line care providers, are uniquely positioned to see a wide range of patients and learn about a variety of clinical problems, which is ideal for identifying critical questions to answer and generate new medical insights (10). Their daily work calls for creativity – patients do not always come with prepackaged clinical problems with easy solutions – sometimes the correct treatment strategy may be something that is not routinely taught or practiced (11). One of the biggest challenges for clinicians is learning how to ask the right questions, beyond what they have learned during their academic training, because no two patients are usually the same (11). Creativity can manifest in many different ways in medicine, such as making connections between disparate ideas (11). Just as it is required in any other field, being creative in medicine requires a willingness to take risks – as it is inherently associated with trying out new ideas.

Yet, there seems little room for creativity in everyday practice of medicine when clinicians are increasingly subject to adhere to pre-determined and streamlined procedures, perhaps at the expense of keeping the bigger picture in mind (10). It has been hypothesized that if the pursuit of creativity is not cultivated with the same energy as the pursuit of efficiency and consistency, it is possible that future generations of patients may find themselves receiving the same care regimens as current patients – just at faster speed (10). While standardization makes sense from a logistical perspective, it also increases risk of promoting a mechanical approach to medicine and patient care (8). When clinicians begin to see patients as a checklist of symptoms, they are likely to miss each individual patient's context which is crucial for making the right diagnosis and an appropriate treatment plan (8).

The role of creativity in medicine is not limited to providing good clinical care that is individualized and holistic in nature. Creativity is necessary for pushing the boundaries in medicine as well (8). New technology is now increasingly integrated in medicine and will continue to do so in the future. It has been proposed that in order to embrace these changes, there is a need for doctors with different talents and experiences, who are able to see problems from different perspectives and seek out different modes of thinking (8).

"Maybe, what we need isn't just more courses and classes telling students what a doctor should or shouldn't be. Maybe instead, what we need is an environment that encourages exploration. One that allows students to create and innovate, as well as discuss and question."

Dr. Poorna Sreekumar, 2016 (8)

"[Dr. Kolker] notes that even early on, he found interpreting the artwork exhibited in the halls of medical school required the same empirical and intuitive skill sets used by doctors in examining and diagnosing their patients. Now he asks, why not immerse medical students in an ocean of the arts, in addition to the sciences, to hone their skills?

Dr. Kolker also describes how artistic expression is intrinsically a process of sharing emotions, and this same process helped him relate more empathetically with his patients. He summoned the artist in him to become a more caring surgeon."

The Foundation for Art & Healing, 2020 (12)

New Ways for Integrating Creativity in Medicine

With greater recognition of the value of creativity in clinicians, there are now calls to integrate creativity in medicine. In some ways, it calls for a culture shift where talking about creativity more often becomes normalized. This can begin with informal water-cooler conversations where clinicians are asked about what they are doing creatively lately, as they likely already have many creative talents that are usually not talked about but can help inform clinical practice (13). There is now recognition that current medical curriculum based on problem-, case-, team-, and evidence-based learning largely prepare trainees on how to apply available information to solve problems appropriately, rather than prepare them to identify opportunities for creative solutions (14). Thus, there can be concerted effort to integrate creative elements in medical training, which may involve incorporating arts, literature and humanities into the curriculum (13). With increasing evidence supporting the use of creativity training programs,

in academic medicine (15). For example, the Innovation, Design, and Emerging Alliances in Surgery (IDEAS) project was designed to provide medical students with the opportunity to identify a problem and propose an innovative solution during their core surgical clerkship (14). A single faculty champion of the IDEAS project guided these students by meeting with them for four to six 90-minute sessions, where an innovative method for identifying and solving a problem was introduced and practiced (14).

It is recognized that including formal creativity programs in medical training may not always be possible due to a wide range of barriers, such as the common misconception that creative thinking can not be taught, as well as concerns regarding resources needed to establish these programs (14). However, a lot can still be accomplished in the absence of formal programs, as long as the right intentions, attitudes, and training approach are in place in medical schools. Having a designated clinician champion can be integral in this case, they can show students all the learned behaviours that underlie the creative process in medicine (14). The earlier students get to learn and apply these behaviours, the better positioned they will be to be creative in their own clinical practice.

> "If you have ideas but don't act on them, I'd say you are imaginative but not creative. Creativity is active, not passive."
>
> **Dr. Bhandari**
> OE World Tour, 2020

> "Creativity is the characteristic of a person to generate new ideas, alternatives, solutions, and possibilities in a unique and different way.
>
> Innovation is an act of application of new ideas to which creates some value for the business organization, government, and society as well. Better and smarter way of doing anything is innovation."
>
> **Surbhi, 2015**

Re-investing in Creativity

It is possible for us to reclaim the creativity we all had as children. In order for us to maximize the impact of our creativity through all our endeavours, we need to be prepared to translate our ideas to action.
At a broader level, all of us can consider the **I.N.N.O.V.A.T.I.O.N.** acronym, which identifies a series of visions and actions to make our imagination a reality, regardless of our field of practice.

- **I** Integrate "quiet time" in your daily routine to reflect on your values, interests, and aspirations.
- **N** Never be afraid to take some risk, try new ideas, or failing.
- **N** Network with individuals with diverse interests from diverse disciplines and socio-demographic backgrounds.
- **O** Out of the Box: be curious, see your world with fresh eyes, question conventions, norms and practices.
- **V** Value quality and utility of work over quantity and efficiency.
- **A** Aspire to receive constructive feedback and resistance to new ideas with an open and rational mind.
- **T** Think of why your idea will work before you think of why it will fail.
- **I** Intuition. Follow your gut. Creativity begins with a "feeling", a "passion" for solving problems.
- **O** Openness to new experiences and learning opportunities to refine your perspective.
- **N** Navigate through adversities with hope, learn to identify benefits of every situation, and strive for continuous improvement.

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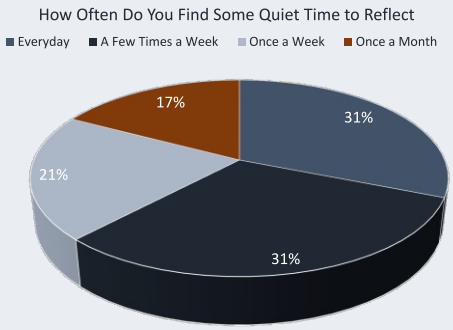
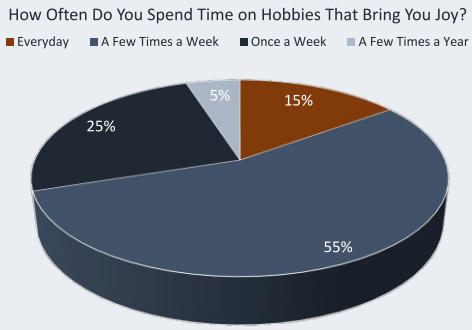
OE Community Insights on Creativity

We conducted a poll within the OE community to gain insights about creativity. Overall, 31% of the participants indicated they find some quiet time to reflect everyday (exhibit 1), whereas another 31% of the participants indicated they reflect a few times a week (exhibit 1). Additionally, 55% of the participants indicated they spend time on hobbies that bring them joy a few times a week (exhibit 1). Majority of the participants felt they were somewhat reaching their creative potential (46%) (exhibit 1).





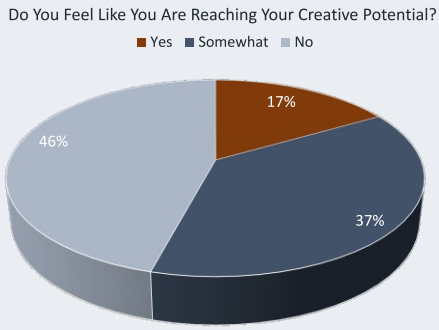


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Exhibit 1: Creative Mindset OrthoEvidence Network Random Sampling

Contributors

Ayesha Siddiqua MSc, PhD
Ayesha Siddiqua has a Masters and a PhD from the Health Research Methodology Program in the Department of Health Research Methods, Evidence, and Impact at McMaster University.

Mohit Bhandari, MD, PhD
Dr. Mohit Bhandari is a Professor of Surgery and University Scholar at McMaster University, Canada. He holds a Canada Research Chair in Evidence-Based Orthopaedic Surgery and serves as the Editor-in-Chief of OrthoEvidence.

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