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Catching up to Yesterday:

An argument for a practical application of creativity for inspiring change from a content-based course delivery to a 21st-century skills-based delivery

by

Darren Chapman

An Abstract of a Project in

Creativity and Change Management

Submitted in Partial Fulfillment
of the Requirements
for the Degree of

Master of Science
May 2024

Buffalo State University
State University of New York
Department of Creativity and Change Leadership

Abstract of Project

Catching up to Yesterday:

An argument for a practical application of creativity for inspiring change from a content-based course delivery to a 21st-century skills-based delivery

This project is a creative vision for how college-level courses could be changed to deliver the most important skills students need in the 21st century—moving toward an essential employability skills-based delivery process while training vocational (content) skills. Technology is outpacing humans' ability to adapt and adopt to it, making it increasingly difficult to keep pace with technological change. This has wide-ranging effects on each of us – productively, emotionally, and perhaps physically. Colleges are at the forefront of educating citizens about the working world to improve their productivity, incomes and their sense of intrinsic motivation. However, these same colleges are finding decreasing levels of self-motivation, increasing recidivism and attrition rates, and higher levels of anxiety, both with students and other stakeholders.

While we cannot change the rate of technological change, we can change the rate at which we adapt and adopt to it, and this is the foundation of this project—to suggest a relatively simple adjustment within the classroom: We become more focused on employability skills and use content as the medium to teach these skills.

I hope this project may inspire current and future faculty to reconsider their approach to teaching within the classroom and perhaps motivate some institutions to consider the process worthy of a deeper investigation into innovative course delivery.

Key Words:

Creative Problem Solving

Essential Employability Skills

Adapt

Adopt

Artificial Intelligence (AI)

Buffalo State University
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May 2024

Dates of Approval:

__May 31, 2024_____ _____ Susan Keller-Mathers _____

Dr. Susan Keller-Mathers
Professor

__May 31, 2024_____ _____ _____

Darren Chapman

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Dedication and Acknowledgements

I have spent over 40+ years in the work world in two different careers – almost 25 years as a medical product market entry specialist, which consumed countless days and weeks away from home, travelling across North America and other international destinations. The other is some 20 years as a community college professor specializing in teaching economics and international business. While these two occupations seem unrelated, they were very much alike – they both involve much training and instruction, especially new and novel products or concepts. What has been clear to me is that I have never been much of a follower in either career, or I have always looked at doing things differently.

Unfortunately, thinking and acting differently has historically been seen in organizations as a negative trait and not a "team" player. Maybe I am a bit of a maverick and see myself as an optimist raised by a pessimist. Optimism had kept me looking for the unseen benefits in all new ventures, especially when times got tough or I bucked another's way of thinking. The pessimism came from having a dominant parent who was an engineer – finding ways in which things can go wrong and dealing with it proactively is the engineer's way of thinking. That is an admirable professional skill, but not so much for being a parent – a child can only hear negatives so many times before one's self-esteem is bruised. Nevertheless, it has led me on a beautiful and fulfilling path, a life full of opportunities, adventures and interests – and always surviving!

One of my most incredible adventures and challenges has been completing this master's degree in creativity. Starting it later in life has provided a different insight than I might have had in taking it in my early years. Now, I am comfortable being different and seeking diverse ways to

solve complex problems. Just as my economics degree taught me a different way of thinking, so too does creative studies – it has enhanced my life and shown me that there is not only a community that thinks as I do, but there is an actual academic foundation to be studied. Finding this place later in life has validated that there are unique places for folks who think like me and that there is commercial value in pursuing it. My journey is a testament to the fact that it's never too late to embark on a new path and discover your true potential.

Another blessing I have experienced is having a near-death experience via a cardiac arrest. And there is one *extraordinary* person who, without him in my life, this project and degree would never have been completed. To my very close friend, John Sing, my guardian angel and saviour, I am sorry to have put this emotional burden on you; however, I am forever thankful you are strong enough to bear it. John found me prone, vital signs absent and immediately started chest compressions to keep the blood flowing to my brain and 𝄞 allow enough opportunity for others and technology to begin life again. Thank you, John.

Second, I would like to recognize a fellow professor and creativity colleague, Perry Broome, who motivated me by believing that I would never complete this degree because I was too judgmental. Thanks also are extended to Gerard Puccio, who hooked me (unexpectedly) toward this journey, and especially to Susan Keller-Mathers, who has the patience of Job and the faith and encouragement of a parent in my ability to complete this journey.

Third, I reluctantly recognize myself for finally attaining a life-long dream of a master's degree. Like many of us who grew up being told how smart or talented we were but not believing it in ourselves, I have finally overcome a burden on my shoulders to prove to myself

that I am worthy of achieving this degree and perhaps even attaining greater levels in my retirement. I have finally embraced a particular thought from one of my academic heroes, Amos Tversky, who said (and I paraphrase as I do not remember the exact words or source) that *it is easier to make the world a better place than to have to prove it*. Through my work, humour and teaching, I believe I will leave the world a better place – it is for others to decide how much. This achievement is not just a personal victory but a testament to the power of perseverance and self-belief.

To those whom I am dedicating this work to: my life partner, Sue, for always loving me for who I am and allowing me the space and opportunity to explore that and for especially seeing something special in the idiot I am; to my son Aaron, who is a kind and gentle soul possessing many enviable traits I wish I held – I have learned a great deal from him. He perseveres, even under the most trying times – "You're almost there, P.". To Brenda, who has demonstrated an unwavering love and strength to our son and brings us joy in being the daughter we have longed to have. And… to little Tess, our first grandchild, who will be born very close to the day this project is finalized. I hope one day you get a chance to read it and find out more about "Al". I am genuinely blessed to have you all in my life. LUD

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SECTION ONE: BACKGROUND TO THE PROJECT

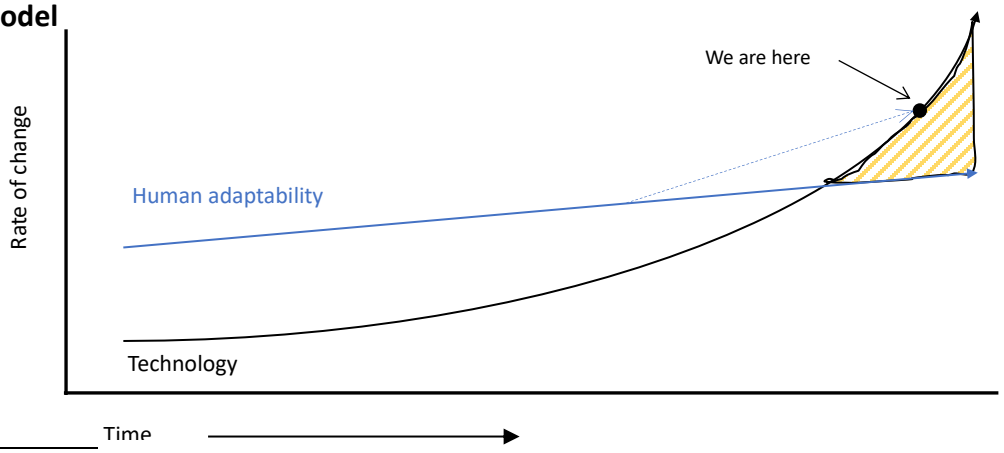
"*Companies want people with an eye for detail, creative problem-solving skills, a collaborative mindset and an ability to deal with ambiguity and complexity.*" (Kumar, 2020)

Fanshawe College is a community college of applied learning in the Province of Ontario, Canada. The community college system in Ontario is different from the US community college system, which primarily consists of lower-cost post-secondary institutions designed for university entrance and study. It was also established to provide skilled labour schooled in practical learning outcomes. These specific skills are referred to as the hard skills (technical). Their outcomes are usually evaluated by specific performance outcomes and standardization, both in the classroom and during a practical application environment. (Laker, 2011) Other colleges in Canada are modelled after applied learning in trades and technician-level professions. The Ontario college system is a hybrid of both. While historically only granting diplomas, it has now started to offer associate three-year degrees to compete with Canadian universities. (Ontario expanding degree options at publicly assisted colleges, 2022) The most populated and profitable schools within the colleges have been the liberal arts and business schools, where most students enroll those who do not have a clearly defined career plan. These students, encouraged by their influencers, enroll in affordable courses within these two programs to hopefully find ideas for future employment. Thus, with no clearly defined career path, many students struggle to be self-motivated and engaged. Studies found that students with clear purpose or career goals were more likely to be motivated and committed to them and that the means to reach their goals is less important than the will to pursue them. Without a clear sense of direction, students may struggle to find meaning and purpose in their coursework and life, decreasing motivation and engagement. (Cotton Bronk, 2009) (Tinto, 1994)

During the almost two decades of teaching in a community college in southwestern Ontario, I have seen a dramatic change in our students and their desire and ability to learn. Some have suggested that it is because of the introduction of search engines or the use of smartphones[1], or even recently, the effects of COVID-19, which has created an unmotivated and disengaged student within our classrooms. Whatever the cause, there is concern for our future students, citizenry, and society.

From my perspective, the problem is significantly deeper – it is an inability (or confidence) of 21st-century students to think, a fear of being wrong, an inability to communicate effectively, and the ability to be resilient in the face of adversity. Students are giving up on themselves as contributors to a changing economic and digital environment. At the same time, the traditional method of teaching content is being challenged by the realities of automation, artificial intelligence (AI) and general uncertainties about where our economies and societies are heading in the future. We see these effects through increased levels of anxiety and defeatism and even in emerging symptoms of burn-out of those who have not yet lit a fire.

Figure 1: **Teller's Model**



[1] At the time of writing the final drafts of this project, the Ontario Minister of Education, Stephen Lecce announced, "new policies limiting cellphone use in classrooms to all social media networks… properties meant to curb distraction levels among the province's students" and assist in helping students focus in class. (Canadian Press, 2024) This new policy is one of the first in Canada that specifically addresses primary and secondary distractions of smartphone use in the classroom and may be foundational in the manner which Colleges and Universities treat smartphone use in post-secondary education.

While some may blame the student or the systems they were educated within my perception and understanding are more complicated. In his book "Thank You for Being Late," Thomas Friedman provided context to the challenges of progress, especially the exponential progress that AI and automation bring to society. He attempts to explain the model of adoption and adaptation of Eric "Astro" Teller, the CEO of X Development, LLC (the creative arm of Google/Alphabet). Teller describes the challenges of the technological change rate and humans' ability to adapt and adopt to such change. Since our inception as a species, humans have always been able to adapt to and adopt technology. However, since the turn of the 21st century, technology has been changing faster than our ability to adapt and adopt (Fig. 1); therefore, we are collectively feeling overwhelmed and unable to catch up (which is illustrated in the shaded area of the figure). The rate of technological change will exceed human's ability to adapt and adopt, so the only way we can change our position is to transition away from learning *what* to learn, toward learning *how* to learn. This is illustrated by the increased dashed slope on the "Human adaptability" line, which can be achieved by emphasizing the EES over the content. Content becomes less relevant in the AI/automation/digital age. While that might be difficult for some to accept, think about how much time and energy we expend attempting to adopt new technologies into our daily lives, only to find newer technology available once we finally figured it out! (How long did it take you to learn to use your new phone – and just when you got the hang of it, you acquired a new one with all its new updated features? Every reader can appreciate the situation.) We feel this angst is the emotional cost of trying to catch up. This anxiety is not limited only to Gen Z (b. 1997+) but to all working-age populations, both professionally and personally. Technology will not reverse course, although some would argue that at least slowing down the rate of technological change would be best for future 1st world generations. (Autor, 2015). However, we can attempt to narrow the technology adoption gap by focusing on the soft-skills, as suggested by Teller.

Emphasizing the essential employability skills (EES)[2] the labour force's need to reduce the technology-adoption gap may have the most significant impact. These skills are broad: communication, numeracy, critical thinking and problem-solving, information management, interpersonal, and personal skills (Essential Employability Skills, 2024) and are specifically identified by the Ontario Ministry of Colleges and Universities as critical skills to be either taught, evaluated or reinforced in every post-secondary college or university undergraduate course.

One essential perspective to consider is that EES have generally been assumed to be subservient to hard skills. However, EES "is considered a more complex construct than 'core' or 'key' skills. It also encompasses both academic intelligence and 'practical intelligence.'" (Yorke, 2004)

As the rate of technology changes, our present educational institutions are slow to recognize the changes around them. While we see evidence of leading-edge institutions introducing programs in creativity and innovation, which challenge students to learn and utilize their various "soft skills," most public or semi-private institutions (community colleges and provincial/state universities) struggle to find the resources, let alone the faculty, to teach at these higher levels. With ever-changing and added content, course leaders and professors are left to their own accord to choose what content to teach within the limited parameters of a 45-hour instructional period/course. Addressing EES in the classroom is an opportunity cost forgoing content unless non-traditional teaching methods can address the two simultaneously.

[2] A complete listing of the essential employability skills (EES) as published by the Ontario Ministry of Colleges and Universities is found in Appendix A, along with additional employability/life skills suggested by the author.

- **Challenge 1**: How might college faculty adapt their teaching methods to include EES and course content without sacrificing, limiting, or adding the number of hours designated for each course?

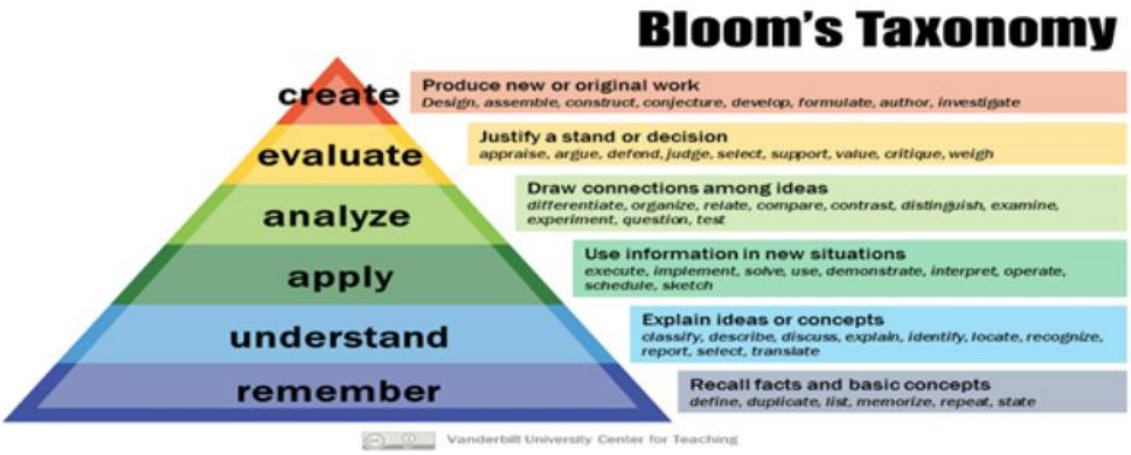


Image credit: Vanderbilt University Center for Teaching (under a Creative Commons Attribution license)

Figure. 2

Bloom's Revised Taxonomy (Anderson, 2001) (Figure 2) illustrates the different levels of thinking and how we mature and transition from lower-order thinking, such as remembering or understanding, to higher levels of evaluative and creative thinking. Students with lower levels of soft skills will find it challenging to progress upwardly through the different taxonomy levels and will be negatively affected by automation and AI. While the Industrial Revolution provided the development of a robust middle class, the new digital economy will polarize our societies back to the times of haves and have-nots. Education primarily based on content will become more insignificant as technology changes faster – a case in point, who would have thought just months ago how much AI has changed the concept of higher education and assessment of all levels of student learning! While content can be easily identified and learned through browsing, the most impactful learning will come from increasing levels of digital literacy – it is not finding the answers within the content but using questions to find different content applications. Traditional education

will move away from teaching students to answer questions to teach and challenge them to use AI by asking the right questions. Interestingly, even at higher levels of education, most students have not experienced being taught how to ask questions. (Berger, 2014) While "many educators acknowledge it is critically important that students be able to formulate and ask good questions, [and]… some of them also realize that this skill is apt to be more important in the future, as complexity increases and change accelerates… questioning is not taught in most schools, nor is it rewarded (only memorized answers are)." (Berger, 2014)

- **Challenge 2**: How could college faculty use the Creative Problem Solving (CPS) model to develop students' ability to ask higher-level questions?

There is also an economic challenge – institutions have modelled themselves as partners in corporate training – primarily teaching students the hard skills demanded by local businesses that will hire their students. Students have been indoctrinated into thinking that only those programs that lead to gainful employment have merit and are worth their investment. At the same time, colleges have reduced or eliminated non-applied courses unrelated to employment. Ontario colleges are evaluated on the number of students hired soon after graduation. However, these students who have relied on content-based accreditation and certification find that these certificates mean less in the new labour market – businesses are hiring on having specific and demonstrated skills rather than the *certification* of having the skills. However, many of these publicly funded community colleges have forgotten that "(s) schools have an educational obligation to teach people about meeting human needs and co-existing." (Ericson, 2022, para. 7)

Colleges are also under pressure to continue being measured on "outcome-based" criteria, generally meant to capture the number of students employed after graduation. These outcomes generally measure only employment, not whether it is full-time or part-time, whether it is

continuous or temporary, or provides minimal employment levels or provides the basis for advancement and promotion. It also does not measure whether students are taking offers of employment they need to survive versus what they desire to do with their lives. Since historical and contemporary visions of education are primarily focused on the economic value of education and less on the life skills of survival, students (and faculty) are pressured into providing as much vocational content as possible in limited instructional hours.

> *In our effort to determine standards for educational adequacy, both theory and practice continue to be haunted by the tension between education intended for life in a democracy, and education intended for work in a capitalist economy. This tension shows up in some significant debates in education, including arguments that pit the economic value of education against its nonmonetary value; general education against specific education; academic learning against applied learning; and vocationalism against professionalism. These dualities do not align neatly. Both general and specific education, for example, have economic and nonmonetary value. The same is true for the intuitive distinction between applied and academic learning*. (Carnevale, 2018. pg. 5)

It can be argued that the pendulum between vocational and life skill training has swung too far to the vocational side and that measuring the outcome of the value (to whom?) has benefitted the productive markets of our economies to the detriment of the consumer/labour markets.

Does our current educational system view this tension as a zero-sum game, where there must be a loss on one side for the other to gain, or can it be viewed as a positive-sum game where both sides gain without any loss? Our experience in our classrooms highly suggests that it is a zero-sum game and that there are possibilities for faculty and students to change that by ways and methods of introducing life-skill training into every course we teach. This is the essence of this project, as stated in Challenge One. Formal curriculum changes will require bureaucratic recognition, studies, policies and funding before any change is made. However, teaching

employability and life skills can be discretely done and interwoven within the content and classroom by inclined faculty. For example, having spent almost twenty years teaching introductory economics to college students, it became apparent that learning employability and life skills was equally important as learning how to think economically. Therefore, I changed the class paradigm, emphasizing employability skills and using economics as my medium. This turns the challenge into one of *how to* rather than *why*.

"Colleges (find) themselves in the extraordinary lucky position of being the only places legally allowed to sell credentials…" (Carey, 2022, para. 15) Websites such as LinkedIn match individuals with demonstrated skills to businesses seeking those skills, and the credentials of a university degree or college diploma are less critical. Ironically, much of the past 20-30 years of education has been based upon preparing students for the job market, and now the market is relying less on the institution's credentials! A World Economic Forum article listed 15 skills LinkedIn suggested students acquire to get hired in 2020 and where to learn them, and none of the "wheres" were colleges or universities – they were all online options offered freely or at a fraction of the cost of college/university tuitions. (Leighton, 2020) "Using a four-year degree as a proxy for employability means relying on talent with potentially redundant skills rather than lifelong learners with ever-relevant skills. It hurts us all, too – because our current over-reliance on college degrees further alienates vulnerable job-seekers." (Kumar, 2020)

The institutions that do not adapt to the realities of the skills-based economy relegate themselves to extinction – which is what we see within the education sector, where strictly vocational content-based colleges find it very difficult to attract and retain students. Even top-level institutions are feeling the economic pinch of slowing admissions (such as demographic shifts (Weingarten, 2017) and rising tuitions (StatsCan, 2022) where students are finding that they can

acquire the same or more current content that is freely available on the web, such as LinkedIn, Khan Academy, Coursera or Google's catalogue of courses. Consumers of education recognize these advantages, but so do employers, especially for firms that do not need professional accreditation from their employees.

- **Challenge 3**: How might we reposition community colleges to assist students in learning life-long learning skills within the classroom and in their personal and professional lives?
- **Challenge 4**: How can community colleges support such changes that allow for the economic sustainability of their institutions?

Student motivation within the classroom has decreased since the advent and use of the smartphone. (Haidt, 2024) (Twenge, 2017) (Wang, 2015) They wonder why they bother reading, engaging, or questioning when all the information they will ever need is at their fingertips. This was true pre-COVID; however, COVID has accelerated this trend while, at the same time, students have become more withdrawn and anxious socially. Couple that with the *faculty's decreasing motivation to teach when students are unmotivated to learn or take responsibility* for their learning mindset. Using a practical example of Teller's 21st-century reality, how can faculty members learn and competently utilize the many different applications to make a classroom more digitally engaging before introducing a new method or application?

- **Challenge 5**: In what way might faculty be trained to deliver content in a new or novel manner that they find engaging and practical that catches the attention of and motivates their students?
- **Challenge 6**: What tools might be developed to support faculty and students pursuing EES and life skills?

For roughly the past decade of teaching, I have wondered how to make my classes more enjoyable and thought-provoking. As economics is my primary course, the content includes skills and material that affect all our lives. Economics, especially microeconomics, is about how individuals and firms make decisions. I have been most fascinated by the ideas of decision-making – decisions of individuals and the individuals making decisions for firms (since firms do not make decisions themselves, people do). Economics must, therefore, be a combination of economic theory, psychology and sociology – and how we think "fast and slow." (Kahneman, 2011)

Scholars Amos Tversky and Daniel Kahneman's development of the ideas of decision-making through their work of behavioural economics won the Nobel Prize in Economics for Kahneman. (Tversky would have been a co-winner but had passed on before the announcement, and the award is not awarded posthumously.) Reading their influential work impacts how I approach teaching. I see so many parallels in behavioural economics, which helps us understand how we think and how to think differently, and the soft-skills, which also impact our behaviours. These ideas formulated the goals I wish to pursue in this project.

Project goals:

1. To suggest and provide arguments that the skills learned and used in the creative problem solving (CPS) model should improve and expand a college student's EES
2. To map parallels between CPS and EES skills
3. To suggest a rationale for employing the CPS model for faculty to use in the development of EES.

There are many reasons for pursuing these goals. However, first and foremost, our current education system is being challenged with providing value to students who believe they are attending leading educational institutions that provide financial gains over the long term that they could not receive otherwise. With the advent of the digital economy, the value proposition has become muted. It will continue if institutions lean primarily on content-based and credentialed education models. Going forward, students must learn how to learn and be comfortable and adaptable to ever-changing environments.

The change will not come about without challenging the status quo. In all my professional years, I have been comfortable with change and challenged the status quo to achieve superior outcomes. This is undoubtedly the case for this project – without change to our system, both students and faculty have become complacent in their roles, and why wouldn't they be if they are of the mindset that they are trying to "*catch up to yesterday*"? We cannot control that which we have no power over, but we can choose to change what we can change – and that is making ourselves more open, ready and excited about the future by how we prepare ourselves for it.

I empathize with our current cohort – they have been expected to learn far more significant amounts of data than the previous generations while having the same time to complete it. Perhaps we (as educators) need to take a step backward and provide the necessary tools for students to thrive in times of exponential change before we perform a data dump on them and expect positive results. Perhaps we should prepare them for change and let them decide what data to learn and how to use it before we indoctrinate them on our visions. The future will likely not be dominated by how deeply we learn different things but by how we combine our learnings into new and novel ideas to use the available data.

SECTION TWO: PERTINENT LITERATURE

This section outlines the pertinent literature and research origins of the project.

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SECTION THREE: PROCESS AND EVALUATION PLANS

PROCESS PLAN

What to do	Rationale	Date	Notes
Research/discuss what skills will be needed in the coming millennium	Provides the essential reasons for this project	Feb - Mar	
What level of skills do current college possess, and identify where there are deficiencies	Identify the level of need for such a project	Mar	It could be a discussion with other professors and me. Survey Monkey 20th-century post covid
Identify which skills are employed in CPS	Provide a foundation of knowledge of understanding of CPS	Mar 31	CPS Docs
Identify which skills are outlined in EES	Provide a foundation of knowledge of understanding of EES	Mar 24	Ministry of Colleges and University, ON
Identify which are personal and which are professional	Are the skills transferable between personal and professional lives	Mar 24	Compare and Contrast
Create a map of ordinary skill and unique skills between EES and CPS	Creating a map of standard and unique skills learned in the two models shows where skills may need to be learned and those that can be reinforced	April 7	
Identify how learning CPS skills can translate into teaching methods of EES		April 14	
Suggest a model of PD that faculty can learn how to teach/reinforce EES in all their courses purposely.	Be able to have a solid understanding of the need and present to Deans for a PD course for faculty in teaching EES skills	April 14	
Thinking	Innate or learned	Mar 31	Define thinking and how we improve as we grow
Concept Paper	Submission to DB	Feb 25	
Sections 1-3	Submission to DB	Mar 24	
Sections 4-6	Submission to DB	April 21	
Final sections 1-6	Submission to DB	May 5th	
Presentation	Zoom Meeting	May 15	

EVALUATION PLAN

This research project should be evaluated on the understanding and demonstration of the following:

- An extensive understanding of what the EES required of post-secondary students in the 21st-century digital economy, as identified by the Ministry of Colleges and Universities, Ontario (2024)
- A broad understanding of the CPS process, particularly how the EES can be demonstrated, used and taught by learning the CPS process within the college system of Ontario.
- The ability to show/map similarities when learning the skills of EES and the CPS process.
- Finally, to provide a strong argument for teaching a foundational course in CPS as a medium to identify and learn many of the EES.

SECTION FOUR: OUTCOMES

The goals of the project were:

A. To identify connections between CPS and EES;

B. To map parallels between CPS and EES skills;

C. To suggest a rationale for employing the CPS model for faculty to use in the development of EES.

The project's primary goals were met in the development of the project. Other outcomes became apparent with the development of the project, namely:

D. evidence of learning soft skills enhances learning of (vocational) hard skills (Salamon, 2022);

E. providing more detailed explanations of EES leads to a better understanding of those skills (Dunlosky, 2013);

F. understanding the importance of and learning how to use questions enhances EES

A. Connections between CPS and EES

In researching to better understand the EES and how it would impact a student's success before and after graduation, it became apparent that just listing the EES would not be sufficient to develop a map of skills—that the lists are only superficial identifiers. For this reason, this project seeks a deeper understanding of the EES skills and then compares or connects to how CPS can assist in skills development.

Secondly, it also became apparent that what was being asked in the initial question could provide two different approaches for the project. First, the initial thought was how learning the CPS

model can help one develop better EES. (**Approach 1**) The second approach is using the CPS model to develop specific skills. (**Approach 2**)

Approach 1: What EES are used in different modes of CPS

In this example, we are approaching the problem from the perspective of how the CPS process can be used to develop better ESS. Any employability skill could be used to illustrate how the CPS process works. However, for this section, we are using "group work" (which is part of the *interpersonal* group of skills of ESS) (see Appendix A) as the example; one would expect the development of group skills when being involved in multiple CPS group sessions. *What are the specific actions or tasks that make for superior group skills*? If one were to take the perspective that the CPS can assist us in developing higher levels of group skills, then the following list illustrates the different skills one might develop while learning the process.

1. **Communication**: Clear and effective communication is necessary for essential group interaction. Communication skills include active listening, verbal and nonverbal communication, clear and concise commentary, and openness and attempting to understand another's perspective.

2. **Active listening**: Being fully engaged in what others are saying; displaying interest in others; keeping eye contact with the speaker; recognizing and using non-verbal queues; listening for understanding v. responding; paraphrasing for clarity; and withholding judgment and opinion.

3. **Empathy and emotional intelligence**: Empathy allows individuals to understand and relate to the feelings and experiences of others, whereas emotional intelligence enables others to manage their emotions and navigate social dynamics effectively, fostering positive relationships within the group.

4. **Collaboration and teamwork**: These are the foundations of working toward a common goal and using each group member as a resource for their expertise, strengths, and/or different viewpoints. This requires each member to be engaged, flexible, and open-minded.

5. **Conflict resolution**: Conflict will occur in most group situations; however, it is important to resolve it respectfully and focus on the problem, not on an individual's traits. This would involve remaining calm under pressure and seeking compromise and/or consensus.

6. **Leadership and followership**: The ability to recognize and participate as either a leader or follower as the situation dictates and the maturity to be flexible and responsible in adapting to either role as the group dynamics may dictate.

7. **Problem-solving and decision-making**: A group's central role is to find problems, analyze them, and then generate solutions. This requires adopting many different thinking modes, such as critical thinking, creative thinking, etc., to consider a multitude of data and come to a successful solution.

8. **Time management and organization**: The group must make a decision. Therefore, it is expected that the group will have strong organizational skills and be able to prioritize its tasks, coordinate its efforts, and do so on time.

9. **Resilience and adaptability**: By nature, groups will likely extend to the edges of the spectrum with regards to group "dynamics", therefore members will need to be able to adapt quickly, to put into perspective the issues that arise, persevere in the face of challenges that arise and be willing to learn from the experiences that group work offers. So much of this part of the group dynamics can be grounded by one of the four basic rules of CPS, *deferring judgment*, where it serves as a foundation for recognizing different perspectives of ideas, but on a wider basis can set the foundation of group dynamics.

10. **Cultural competence and diversity awareness**: In today's world, where we work with and alongside many different individuals from across the world, and especially given the new realities of working in the digital and virtual worlds simultaneously, it is even more important to recognize and accept the impact of cultural and diverse backgrounds. Perhaps going forward, it will no longer be the "only" solution but the "best" solution or even the "workable" solution.

Approach 2: How to use the CPS process in developing EES

However, one could take the approach of using the CPS model to provide a process for developing better group skills. The Creative Problem Solving (CPS) model can be instrumental in helping students develop better group skills by providing a *structured framework for collaboration, fostering creativity, and promoting effective communication*. Here's how CPS can assist students in this regard:

1. **Shared understanding of the problem (Clarify)**: The CPS model emphasizes the importance of defining the problem before attempting to solve it. By encouraging students to identify and articulate the problem they are facing collectively, CPS helps ensure that all group members have a shared understanding of the task at hand. This shared understanding lays the foundation for effective collaboration.

2. **Brainstorming and idea generation (Ideate)**: CPS encourages a wide and divergent way of thinking, leading to a vast array of ideas generated. In a group situation, this means that students can leverage the creativity and unique perspectives of the group members to generate innovative and novel solutions to the problem. By facilitating brainstorming sessions and creating an environment where all ideas are welcomed and valued, CPS promotes inclusivity and active participation within the group.

a. **Encouragement of active listening and respect of diverse perspectives**: Effective communication is essential for successful group collaboration. CPS teaches students to actively listen to their peers, respect diverse cultural and professional perspectives, and build on each other's ideas. By fostering an environment of open-mindedness and mutual respect, CPS helps prevent conflicts and encourages constructive dialogue within the group. As a facilitator of CPS, and active user in the classroom, I have seen transformational progress in students' self-awareness and their ability to "own" their ideas and be willing to share and elevate those ideas with others. Having others consider, let alone accept one's ideas builds one self-confidence and is willing to extend that emotion for oneself and promote it for others. Over time, the classroom evolves from one of passive learning to one of active learning.

b. **Recognizing and developing empathic skills**: Not only do the rules of CPS set a tone of respect and attempt to see ideas from another's perspective, but they also provide a fantastic opportunity for practicing empathy. This is especially important in the current environment of AI and automation, where the vast population is experiencing higher levels of stress due to constant and fast change. (Brynjolfsson, 2014) (Friedman, 2017)

3. **Evaluation and decision-making (Develop)**: Once a range of ideas have been generated (and here we strive to focus on quantity v. quality), CPS provides a structured approach (grouping "like" ideas into distinct groups) for evaluating and selecting the most promising solutions. Analyze the potential solutions that meet the criteria and whether implementation is possible. (Puccio G. J., 2011) (Notice here that it is not the "best" solution, but the most "promising" – which allows for a change in the future, or if time or circumstances change, that requires a different approach. The

point is that students are made aware of subtle differences in their chosen words, which is developing their communication skills!) Students learn to consider different criteria, such as feasibility, impact and importance to the goals, when making decisions as a group. This encourages students to weigh the pros and cons of different options critically and collaboratively.

4. **Formulate a plan (Implement)**: Once the group has come to a consensus of how to solve the problem, they then consider how to move forward from a thought to an action. The is not solved until it is solved! This mirrors what Ruth Noller described as [a=V, DP, IM], where a is *attitude* and is equal to vision (a destination for one's creativity), *deliberate practice* (repetition of proven creative methods that individual' begin to enhance their creative-thinking powers) and *intrinsic motivation* (that internal power to do what's necessary to reach the vision). (Noller, 1972) Attitude is all about action, for without action, there is ultimately no solution—only suggestion. A plan is a roadmap to the end, with deliberate goals, timelines, and responsibilities to meet the objectives. Here, the students are presented with the reality that learning (whether individually or with a group) is a process, not a destination.

5. **Reflect** (Evaluation): Finally, evaluate the effectiveness of the strategies implemented and the group's learning experiences, both as an output product and the process of working within the group. Concerning the product, did what was produced meet the goals and criteria of the problem sufficiently (or exceed them) – were all the group members satisfied with the end product? Concerning the process, was it conducive to assisting the group in reaching their goal faster, better, deeper, etc.? The reflection might involve assessing the group members to interpret and create the product, solicit feedback on the usefulness of specific learning activities and objectives, and identifying areas for further improvement.

In summary, this section demonstrated that CPS and EES have many connections, and various approaches can be employed in connecting the skills used in CPS and the EES. One approach was to identify which skills were identified and used in CPS. A second approach was to show that CPS can be used to teach or reinforce different EES. Regardless of the approach, there are many specific links between the two, demonstrating that CPS can function as a proxy for teaching EES. Either approach deserves greater study on what may be the best way to apply in a practical application within a college or university course.

B. Mapping Connections between CPS and EES

Plenty of EES are employed during the CPS process. It can be argued that learning and using CPS is a suitable surrogate for learning EES independently. Appendix A is a glossary of the EES identified for Ontario post-secondary institutions to teach, reinforce and/or assess (Essential Employability Skills, 2024) Appendix B identifies the different skills used/acquired in the CPS process. (Puccio G. M., 2012) Figure 3 illustrates two ways in which EES and CPS are connected. The circles show the EES that could be taught or reinforced using the CPS process to address problems. These include the vast majority of EES, and CPS can enhance the learning of the other external skills, represented in the figure as boxes.

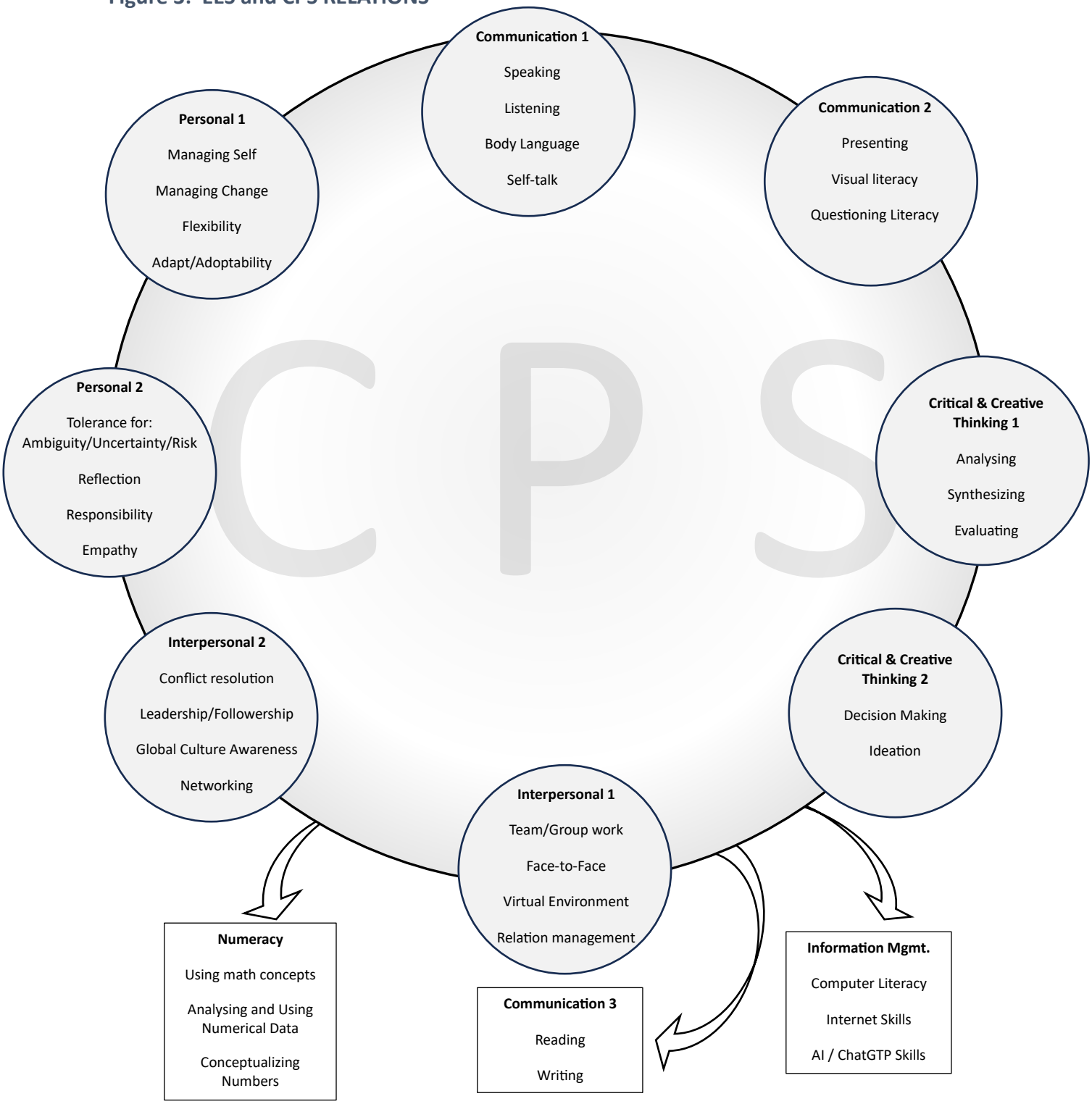
The thinking of how CPC enhances EES learning is to consider how skills that are predominantly within the affective domain (skills such as emotional intelligence, tolerance for ambiguity, listening, or use of body language, etc.) enrich and empower and those in the cognitive thinking domain (such as numeracy skills, reading, writing, computer literacy, and internet skills). (Puccio G. M., 2012) One is not using a process such as CPS solely to teach EES but uses the different skills within each skill group to raise a student's overall thinking and social

skills. There is ample evidence to show that students who exhibit higher levels of social skills and social responsibility tend to achieve better outcomes academically (Wentzel, 1993), and students who demonstrate positive social behaviours such as cooperation and self-control are predictors of higher levels of academic achievement (Malecki, 2002), and effective social skills training improve academic achievement (DiPerna, 2002). This bodes well for the use of learning CPS as the process is highly social and demands social interaction between participants. It is also an enjoyable and engaging process that provides a safe environment for students learning to extend their social skills. (Treffinger, 2006) (Basadur, 1986)

CPS involves creative thinking, which involves higher-order thinking skills outlined in Bloom's Taxonomy. Anderson et al. suggest that cognitive processes are interrelated and that higher-order thinking skills depend upon the understanding and development of the lower-order levels. (Anderson, 2001) This does not mean that only those at the high levels can practice CPS; instead, the more proficient they are at the lower levels, the more they can elevate their performance in CPS, thus achieving higher levels of both EES and CPS.

In summary, EES and CPS are related—a great deal of EES is used within the CPS model, augmenting better outcomes for CPS as the EES is developed. Second, seemingly unrelated EES can be improved by using CPS as they achieve levels of thinking. Finally, given the above, there is a strong argument that CPS training should be incorporated within a college education (in any number of programs) as it improves student outcomes and enjoyment of the learning process.

Figure 3: EES and CPS RELATIONS



The EES most likely to be taught or reinforced within the CPS process is illustrated in circles, and those for which the CPS process would enhance the learning of the skills are in boxes

C. Suggesting a rationale for employment of the CPS model for faculty to use in the development of EES

- Greater student in-class engagement – direct connection of learnings in a practical application
    - Treffinger et al. found that the CPS model, which includes the stages of fact-finding, problem-finding, idea-finding, solution-finding and acceptance-finding, helps students develop EES and that by involving students in the structured process of CPS, they become more engaged and invested in their learning. (Treffinger, 2006) Courses or programs integrating creative thinking strategies, such as brainstorming, mind mapping and lateral thinking activities, have increased student engagement. (Fasko, 2001)
- Flip the priorities of learning from content to EES.
    - It has been my anecdotal experience over the last decade that flipping from a central focus on content to focusing on ESS and using the content as my medium to teach the EES provides a more stimulating and active environment within the classroom. Student engagement has increased, and students tend to be more responsive to how the content affects them.
- Preparation for 21st century learning
    - many studies and reports conclude that learning and upgrading one's soft-skills are essential for the 21st century labour market. (World Economic Forum, 2020) (Carnevale, 2018. pg. 5) (Brynjolfsson, 2014) (Basharat, 2020) (Mitchell, 2008) (Leighton, 2020)

- Development of self-confidence and self-awareness
    - There is ample evidence to show that soft-skills contribute significantly to self-confidence and self-awareness by improving learner's ability to interact effectively and navigate complex social situations. (Robles, 2012) (Heckman, 2012)
- EES enhances the learning of the hard-skills
    - This idea is discussed in greater detail under the following section, "D."
- Student retention for educational institutions
    - Student retention and college/university readiness are closely related and well-documented in several studies. These sources underscore the positive link between developing soft skills and student retention, demonstrating that soft skills contribute significantly to student engagement, persistence, and academic success. (Robles, 2012) (Heckman, 2012) (Kuh, 2006) (Yorke, 2004)
- Product differentiation between competing institutions
    - Generally, the decision to attend a post-secondary institution is influenced by various reasons: career aspirations, personal growth opportunities, social experiences, access to resources, institutional reputation, societal expectations, financial aid availability, and specialized academic programs. There is another idea that is not as common as the previously mentioned considerations, but perhaps it should be. Well not explored or developed in this project, it is an area that may be further considered and studied – the impact of embedding EES in every course of students' choice of study. In a time when employers are demanding their skills, taking on a more proactive and aggressive learning model may provide a unique differentiation between institutions.

D. Evidence of EES learning enhances the learning of the (vocational) hard-skills

While not a specific goal of the project, the discovery that learning the "soft-skills" enhances the learning the hard-skills. Evidence shows that "soft skills training may need to be embedded within existing technical or job-specific training programs, and not necessarily as stand-alone programs." (Futureworx, 2019) The Ontario college system was primarily established in 1967 to educate students on the vocational skills required to enter the labour market. This remains true today as well. One thing that has changed since 1967 is the level of technology and the individual's relationship to the complexities of various capital assets. In the 1960s, human physical capital operated equipment – today, it is the automated operation of capital assets. The level of human input is more needed in operating a computer or master board than in making physical adjustments to the machines. This means that a whole new level of education is required, and it is required much quicker and more in-depth than a half-century ago. "In Canada and across the world, there is increasing recognition that technological shifts in the economy are leading to a greater demand for a diverse set of skills, referred to as "soft skills" (Basharat, 2020)

Hard-skills are often referred to as vocational skills or technical skills. They are specific and measurable and learned through education or a hands-on approach. Such skills are usually validated through some form of accreditation or certification, which requires attestation or demonstration of proficiency in the skill. Ontario colleges were established to provide these skills to new entrants to the labour market. Generally, students attending colleges or other educational institutions believe they are there primarily to acquire these hard-skills.

One of the challenges for contemporary formal educational institutions is proving to the labour market that the accreditation that they provide students represents the level of hard-

skills students have acquired for programs that run on behalf of established labour or professional groups such as electricians, plumbers, respiratory therapists, dental hygienists, etc., where upon successful completion of the student's program, they have demonstrated minimum skill attainment levels for the labour or professional organizations that represent the discipline. However, for programs where such organizations do not exist or exist loosely (such as receiving a general arts diploma or a business certificate), the market relies on the rigour and expanse of the program's content when students receive their accreditation. Employers have recently been turning to sites like LinkedIn for third-party validation of acquired skills. (Constantz, 2023) In order to counter this challenge, colleges must provide reasons for students to focus not only on the hard-skills, but also on the soft-skills. One of the ways that this can be achieved is by how faculty view the classroom and the content. If learning the soft-skills is as, or more critical than the hard-skills, then changing the classroom approach to learning is necessary. For almost a decade, I have addressed this within my courses and classroom – where students believe they are coming to learn economics, I share with them, on day one, that they are here to learn the soft-skills like communication, higher-order thinking, group work, and that I am using economics as my medium. In this approach, students understand and participate in learning these skills, knowing they are in a safe environment to challenge themselves in advancing their soft-skills.

While there does not seem to be a universally accepted definition of what the soft-skills are, for the most part, the academic community and the labour market generally accept that they are an amalgamation of the skills that are included in the EES, as well as other skills such as emotional intelligence, inter and intrapersonal abilities for the advancement for a rewarding life and successful (however each individual defines "successful") career. These skills are more closely related to individual personality traits or behavioural qualities. (Guerra, 2014) An SRDC report revealed that there was a direct link to combining the soft-skills with hard-skill training,

especially for Opportunity youth (Guerra, 2014) (Opportunity youth are defined as young people who are actively seeking opportunities to succeed but face individual, structural, and social barriers to finding sustainable employment. (Expert Panel on Youth Unemployment, 2017)) A doctoral thesis by Hanson concluded that adult learners benefit from the combination of soft and hard-skill education as much as high-school, college or university students. (Hanson, 2020) Hanson's findings are particularly relevant for Ontario colleges, which have a large enrollment of adult learners throughout the system.

Going back to Eric Teller's argument that humans need to change their adaption and adoption rate of new technology to reap its benefits, a plethora of studies have addressed this need, albeit indirectly. These studies look at the relationship between learning soft-skills and learning vocational skills (hard-skills). (Basharat, 2020)

E. Detailed explanations of EES lead to a better understanding of the skills

Providing a detailed explanation or definition of each skill enhances learning outcomes by promoting contextual understanding, conceptual proficiency, a heightened awareness of using examples and illustrations, a connection to prior knowledge, and the retention and application of new or reinforced skills. These criteria are addressed either expressly or implicitly in learning and applying CPS.

A detailed explanation of contextual understanding clarifies why each skill is important and how it relates to specific learning objectives. This helps each student understand the skill's relevance and how it can be applied in different contexts. Conceptual proficiency is attained by breaking each skill into manageable parts so the student can grasp each skill's underlying

Principles, theories, and strategies. This is extremely important for college-level students who have learned on a cursory level during their secondary or high school level.

Providing examples and illustrations of how the skill is used is especially important to those who are tactile or visual learners. It is not enough to explain but to demonstrate how it might be used. For example, a practical and simple gesture of making eye contact and nodding provides the speaker with information that there is an understanding of the concept. Furled eyes or a slight head shake convey a lack of understanding. These active processes provide a greater depth of understanding and use of an EES.

Connecting to past experiences or prior knowledge enables learners to connect to the new skills they are learning and transfer those skills into different situations or contexts. This gives students a different approach to learning these skills and a foundation for building their confidence and self-awareness.

For example, in my economics class, if I ask a student what might happen if we increase demand on a specific problem, they might provide any number of responses, some of which might be relevant. However, suppose I ask a student to take a systems approach (determining how individual parts are interrelated to the whole) and apply magnitude thinking. In that case, they might provide a deeper understanding of how demand affects price and quantity but also may induce a change in supply and taking in magnitude; the student is likely to see that too much or too little of a change in demand may increase or decrease both price and quantity. Providing a more specific and detailed explanation provides higher levels of understanding and increased learning. (Dunlosky, 2013)

Retention and Application: Research suggests that elaborative interrogation, which involves providing detailed explanations and encouraging learners to explain concepts in their own

words can enhance retention and promote deeper understanding (Dunlosky et al., 2013). Detailed explanations help learners consolidate and apply their learning flexibly in diverse situations.

As a practical application, faculty and course developers need detailed lists and expectations concerning the EES published by the Ontario Ministry of Colleges and Universities. Individual course developers or professors are given a broad interpretation of what EES needs to be taught, reinforced or evaluated within each course. However, without a detailed explanation, there is no consistency in what skills are addressed, how they are addressed and to what level of breadth and depth they are addressed. With too little explanation, there is less expectation that the skills will be addressed.

Recognizing that the skill of listening is included in EES, some students might be confused or not know the difference between listening and hearing. If a professor asks, "Are you listening to me?" a student might answer in the affirmative that they have heard what was said. Hearing is a physical process of receiving sound waves -- it is a physical requirement for one to listen. Listening, however, is an initiative-taking process – one needs to pay attention to the statement, but also the subtleties of comment, paying attention to pace, intonation, and loudness, all the while viewing body language, providing simultaneous understanding gestures by making eye contact or other non-verbal clues to be engaged in the listening process fully. One's skill level in listening is based upon how well one understands and perceives the message delivered, and the listener must be vigorously engaged in the process – this is what "active listening" means. Learners need to know what listening is and how to be a better listener, and this can be achieved by providing a more detailed explanation of the skill.

In summary, all of the criteria for why providing more detailed explanations of skills is important are addressed with the application of CPS as a foundational skill that should be taught to Ontario college students.

F. Understanding the importance of and learning how to use questions enhances EES

One of the exciting outcomes of the project was that while those educated in the CPS process are taught to think in higher-order questions, "How might…" or "Why would…", it became evident that college students, in general, are not even close to that level of question awareness. In fact, throughout this last semester, I made a point of asking my students and having colleagues ask their students on my behalf how many were taught how to ask questions in either primary or secondary grades. Most of my experience and feedback from the other instructors was that only 10-20% of students reported they had intentional instructions on asking questions. When we think about it, how many of us, even as instructors, were taught, let alone evaluated, on the levels or quality of our questions? We are all evaluated on how we answer questions but rarely on how good or appropriate our questions are.

As we have entered the digital age/economy, and especially the speed at which our lives have been affected since early 2023 when the first accessible and complex AI models were released, the world as we know it has changed dramatically. Coupled with smartphones, AI and automation have essentially changed our learning models from learning content to learning how to use the tools of AI and automation to access usable content. As mentioned earlier in the paper, the focus for post-secondary education should be on learning how to learn, not what to learn -- to get to higher levels of learning, students must develop higher levels of EES, particularly in question development. Note that AI cannot ask questions – AI relies on the

question provided to provide a deeper understanding of knowledge. It is no longer the quality of one's knowledge that will set them apart in the AI era, but how well one can develop appropriate and complex questions to access this material. Since one is limited to one's knowledge, the quality of their questions is also limited – learning these new skills through different models such as CPS and QFT provides the medium to develop higher levels of EES.

The Right Question Institute (RQI) is a non-profit organization focused on "developing and sharing teaching methods and skill improvement techniques that focus on questioning self-inquiry, self-advocacy and citizen participation.) (The Right Question Institute, 2024) In 2017, the Institute was granted funds from the National Science Foundation through Brandeis University to develop the Question Formulation Technique (QFT) (The Right Question Institute, 2024), which is a structured method for generating and improving questions. It distills sophisticated forms of divergent, convergent, and metacognitive thinking into a deceptively simple, accessible, and reproducible technique. (What is the QFT?, 2024)

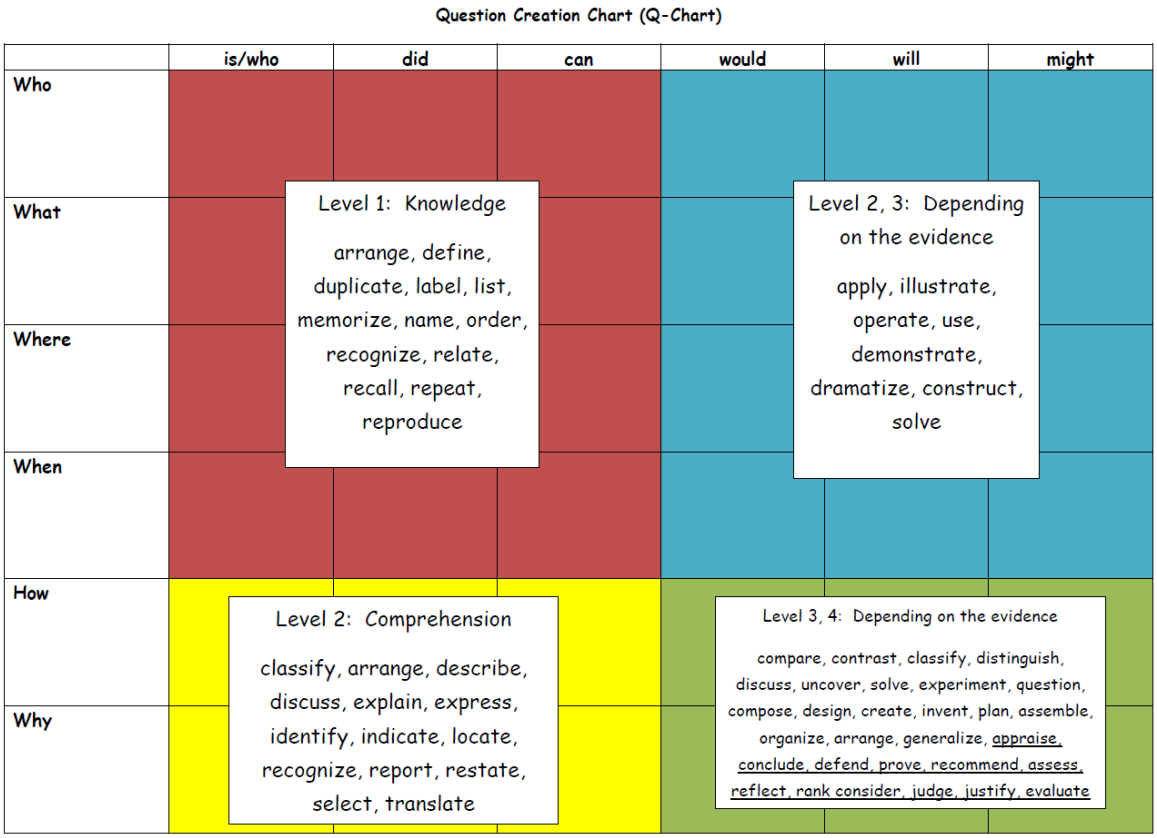
To assist students in learning different types of questions, QFT facilitators can adopt the Question Creation Chart (Q-Chart), which accelerates learning how to ask questions. The chart (see Fig. 4) employs different stems, such as *who, what, where, when, how* and *why*, and pairs those with different verbs, such as *is/who did, can, would, will, and might,* to elicit different levels of questions, hopefully developing a learning method that provides a specific tool to inspirer learning.

The CPS model utilizes a very similar approach to questions; however, it elevates the levels of questions into the top tiers of Bloom's Taxonomy (elevate and create) by using a set of questions unique to CPS: "How to…" (H2), "How might…" (HM), "In what ways might…" (IWWM), "What might…" (WM), "Why…." (Y), "Why else…" (YE)., and "What is stopping me…"

(WSM). CPS attempts to stretch the individual's might-set by *thinking beyond the obvious* and *pushing deeper*.

Note that there are four colours on the Q-Chart. The first level of questions is represented by the colour red –*knowledge* questions, and they form the base level, "remembering" in Bloom's Taxonomy. The second level, represented in yellow, consists of questions that capture comprehension or understanding in the taxonomy. The blue level is the third level of questions, and it is represented in Bloom's as the *apply* and *analyze* levels. Finally, the fourth and highest level of questions is the green question, which attempts to illicit evaluation and creative taxonomy levels. We, as educators, strive to bring undergraduates from a base of level two or three up to a level four student in terms of questioning ability – unfortunately, over the past decade (for reasons previously discussed), we have seen students barely reaching level two as they enter college and little motivation to move beyond. Where, as educators, we took a passive approach in teaching questions, it has now become apparent that we must take a more proactive approach in teaching, using and reinforcing question development. Using tools such as the Q-Chart IS is beneficial; however, if we introduce the tools in teaching problem-solving models such as CPS and QFT, we can combine and connect different EES and cover the required content within each course.

Figure 4:



QFT is a remarkably similar model to CPS but in reverse. Whereas CPS sets up questions to engage students, OFT sets a "Q-Focus," a word, phrase, image, problem, etc., that gets the questions flowing. QFT also has structured rules that apply during the divergent stage, like CPS: 1) *ask as many questions as possible, 2) reserve judgment, 3) record precisely the question, and 4) change any statement to a question*. The CPS principles are: 1) defer judgment, 2) go for quantity, 3) make connections, and 4) seek novelty. Students brainstorm to produce as many questions as possible following the rules and then group the "like" questions to uncover key themes. From the themes, students prioritize which they wish to pursue.

The model uses very similar steps, including divergent and convergent processes, ranking and selecting ideas, and building upon the ideas of others. Within the process, students are actively involved in developing their communication skills, especially in the power of questioning and using

different types of questions (such as open-ended and closed-ended) to elicit different perspectives to attain data detail. Like CPS, a well-trained facilitator can adopt different thinking modes to steer students in several directions and open a world of possibilities.

One of the impressive externalities of QFT is that it changes the student's perspective on having to get the "right answer" (is there only one correct answer?) to one of many different "right questions," as we all have learned, there is no wrong question! This liberates students from stepping out of their comfort zone and asking silly or disjointed questions that make little sense on the surface. If that were to happen in a traditional classroom, the likely outcome would be jeers and uplifted eyeballs, signalling negative emotions toward the student. With QFT, students (through the QFT tenets) are taught and reinforced several EES on the personal level (managing self, managing change, engaging in reflective practices, *demonstrating personal responsibility and learning to be empathetic*). These are vastly similar outcomes when applying CPS as a skill development model.

In summary, the skill of questioning should be included in the EES catalogue. Most of our education has been based on answering rather than learning to ask questions. In the emerging AI/automation age, answers will be more easily accessible, provided we ask the right questions – a skill that requires greater attention. A question was posed to ChatGPT about what skills were required to exploit the benefits of AI, and the response pointed to both technical and non-technical skills. (See App "D")

SECTION FIVE: KEY LEARNINGS

Five key learnings came from undertaking this project:

1. **There is a great deal of commonality and connections between CPS and EES**.

Before the project, it appeared that there were several connections and common elements between the EES and CSP. However, the breadth and depth of the connections greatly influenced how learning CPS on its own would benefit both students and educators.

2. **Learning and using the CPS model develops and enhances the EES**.

Anecdotally, I believe that learning and using CPS helps students learn different EES since I employed a variation of a flipped classroom, focusing on EES and using the content (economics, in my case) as my medium. There was no question that this teaching method got students to think deeper and broader about the economic problems presented. Moreover, their communication, questioning, and thinking skills improved immensely over the term, as did the level of student engagement and attendance improved. This ultimately energized me to develop this experience into this master's project.

3. **CPS can be a suitable surrogate for learning EES independently**.

One of the challenges in the current post-secondary learning environment is just the vast amount of content that must be covered within the limits of a semester. As a result, instructors are skewed in favour of teaching content over the EES, so EES is not covered.

Throughout this project, I discovered that integrating CPS into the curriculum served as a substitute for teaching the EES independently and equipped students with a skill set that could be applied across their academic journey. This raises a crucial question for educational institutions: Should they consider incorporating CPS as a standalone course or a component of "student success" courses? The potential benefits of enhanced EES learning are significant.

4. **Learning CPS early improves overall student achievement**.

My belief that early CPS learning could enhance overall student achievement was reinforced by my experience in teaching/reinforcing EES and using economics as a medium. The abundance of studies and data demonstrating improved student outcomes with higher levels of EES further solidified this belief. This underscores the argument for introducing CPS as a standalone course early in the post-secondary journey of students.

Another key learning outcome of improved student achievement is a great deal of interest in institutions improving recitative rates—students with improved EES are more likely to graduate, some of whom will go on to other educational options such as graduate certificates or master's degree levels. Improved student achievement benefits both students and educational institutions.

5. **Inverting the CPS model from posing questions to the QFT model of posing statements or foci teaches students to ask better and more profound questions**.

While CPS opens a new world to students that pushes them to learn at higher levels, it still relies on their ability to think in a questioning mode and to develop higher orders of questions. Few students have been intentionally taught how to ask questions, and as a result, we see many students in community colleges achieving only the lower levels on the taxonomy scales. Inverting CPS into the QFT process is an equally beneficial approach to improving EES, especially in an age of AI where the quality of outcomes is directly correlated to the quality of questions asked. The project offered a strong argument for using QFT along with CPS.

SECTION SIX: CONCLUSIONS

"Come gather 'round people
Wherever you roam
And admit that the waters
Around you have grown
And accept it that soon
You'll be drenched to the bone
If your time to you is worth savin'
And you better start swimmin'
Or you'll sink like a stone
For the times they are a-changin'"

Bob Dylan, 1964

The world as we know it is undergoing colossal change – physically in terms of global warming, socially/politically in a new age of populism, and economically in terms of global markets and AI/automation. This profoundly impacts our ability to learn what to learn and how fast we must learn. The title of this project, "Catching up to Yesterday," reflects the possibility that personkind will never be in a place of manageable stability and that the coming second machine age (Brynjolfsson, 2014) will present challenges and opportunities for proactive measures to harness the benefits while mitigating the downsides of digital technologies and the economy, especially the labour markets.

This project offers an approach to one proactive measure, based upon Eric Teller's futuristic vision – that while it will be impossible going forward for personkind to retake the ability to adopt and adapt faster than technology changes going forward, we can change the trajectory of the rate of adoption and adaption by learning the skills of our heritage – relying on improved communication skills; creative problem-solving skills, and; mastery of both inter and intrapersonal skills. This process involves elevating the EES in post-secondary education, where it becomes the paramount goal, displacing content to an equal or even lesser level of importance. Content understanding will

forever be available through multiple channels of online learning. However, the EES is something learned and used on a very personal level. Machines are very good at providing historical data to assist us in understanding concepts we are unfamiliar with. Automation and AI are not good at some unique processes of creativity and questioning – they demand higher levels of human intervention to achieve their potential. Thus, humans can achieve even more remarkable achievements if we look back and master the unique human skills we are blessed with – those outlined in the EES.

The project suggested that post-secondary institutions would be wise to put more resources and emphasis on developing higher levels of EES and that learning and applying the CPS model across a wide array of courses in post-secondary education would be a worthwhile investment since many of the skills of CPS include and require higher levels of EES mastery. Within the classroom, faculty can significantly improve student engagement, learning and course enjoyment by flipping the emphasis from the traditional delivery process where content is paramount to one where the EES overrides the importance, and the content becomes the medium to raise students' EES.

Completing this project has been an exercise in creating, gathering, and organizing creative, logical, and practical thoughts. The idea behind it has been mulling in my mind for over a decade, and it has manifested itself from time to time in various approaches to teaching economics. Luckily, economics is a course in which time and circumstances change, so the reality of applying the theory of economics can take on a variety of responses. The course lends itself to a creative approach to teaching it.

Had I realized that the project was a creative thought process from the beginning, I think it would have been a great deal easier to write and complete – to say it was a struggle for me would be an understatement as I have been caught in (I presume) a polarity – one of conceptualizing what

the problem was and formulating an idea worth of identifying for the college community, and the other formulating a thesis statement, researching data and presenting and defending an outcome. I am not sure I have become comfortable with the process I took on, and I am still questioning my approach. Nevertheless, I am satisfied with my approach in that the final product does identify a problem and provides a creative approach to addressing it.

I am also uniquely positioned to address the issues and challenges the project identified. I have over twenty years of experience in both of my chosen careers. Thus, I bring a perspective of what students need to develop and apply in the working world, and I have both the theory and practical experience of how economics works. In both careers, I am an educator, and I believe, above all else, that great educators must be great communicators. Working through this project, it became evident that what seemed like an obvious method of teaching was, in fact, distinctive. The project also became somewhat of a biography of my teaching methods, which made it much easier for me to find my footing in how I would approach the project.

This project has been a wonderful experience – one that has pressed my thinking of the limits and opportunities of both automation and the uniqueness of creativity and imagination -- will we find ways to live with the second machine age that benefits all classes of society, regardless of the current standing of economic development? In pursuing this project, several questions arose that were beyond this project's scope but deserve some consideration and further research. These are but a few worth presenting:

- Do higher levels of achievement in the EES lead to more rational decisions?
- Do higher levels of achievement lead to fewer biases in decision-making?
- Are those with higher levels of achievement in the EES able to control their emotions more effectively in decision-making?

- Does training in CPS influence decision-making in a positive or diminished fashion in the cognitive realm? In the affective realm?
- Is the investment of CPS training in the first or second years of post-secondary education worthwhile, and under what criteria would it be measured?
- Considering CPS, which form of assessment (formative v. summative) is better/preferred over another, and under what conditions?

From a personal and anecdotal perspective, my investment in CPS training has provided one of the most rewarding outcomes of my life. Beyond the analytical thinking of an engineer, the possibilities of an optimist, and the recognition of scarcity and choices of an economist, creativity and creative problem-solving bring another level of thinking and viewing the world—and it is full of optimism.

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APPENDIX A

GLOSSARY OF EES (ESSENTIAL EMPLOYABILITY SKILLS) TERMS

- **SKILLS CATEGORIES:**
  - **Communication**[3]
    - Reading
    - Writing
    - Speaking (tone, intonation, pace)
    - Listening (listening v. hearing/understanding)
    - Body Language (inviting, closed, energy, bored, etc.)
    - Presenting (business/casual/formal/informal)
    - Visual literacy (images/graphs/informatics, etc.)
    - Internal communication (self-speak/confidence/intro v extrovert)
    - Questioning literacy *(Author's additional input)* (hierarchy level of questioning)
  - **Numeracy**
    - Understanding and applying mathematical concepts and reasoning
    - Analyzing and using numerical data
    - Conceptualizing
  - **Critical and creative thinking and problem-solving**
    - Analyzing
    - Synthesizing
    - Evaluating
    - Decision making
    - Ideation *(Author's additional input)*
  - **Information management**
    - Gathering and managing information
    - Selecting and using appropriate tools technology and information systems
    - Computer literacy
    - Internet Skills
    - AI/ChatGPT skills *(Author's additional input)*
  - **Interpersonal**
    - Group/teamwork
    - Face-to-face and virtual (*Author's additional input*)

[3] Albert Mehrabian's 7%-38%-55% Rule of communication focuses verbal and non-verbal communication and through his two seminal studies (Mehrabian A. &., 1967) (Mehrabian A. &., 1967) highlights relationship that words (7%), tone of voice (38%) and facial expression (55%) convey feelings and attitudes in communicating a message. It's not without its criticism, and is not current with different methods of communication such as virtual meetings, however still is impactful in understanding that word communication alone is very limiting to how the overall message is received. If the deliverer is aware of this ratio, one may choose to be aware of "how" v. "what" in messaging.

- ♦ Relationship management
- ♦ Conflict resolution
- ♦ Leadership
- ♦ Networking
- ♦ Global/cultural awareness *(Author's additional input)*

- **Personal /Affective**
  - ♦ Managing self
  - ♦ Managing change and being flexible and adaptable
  - ♦ Engaging in reflective practices
  - ♦ Demonstrating personal responsibility
  - ♦ Empathetic *(Author's additional input)*
  - ♦ Tolerance for ambiguity/uncertainty *(Author's additional input)*
  - ♦ Tolerance for uncertainty *(Author's additional input)*
  - ♦ Tolerance for risk *(Author's additional input)*
  - ♦ Openness to Novelty *(Author's additional input)*

APPENDIX B

CREATIVE PROBLEM SOLVING SKILLS

The following is a list of the different skills used in CPS. It is a process rather than a "pick and choose." However, one can pick where to start and use which particular skills or tools moving forward. These originate out of the CPS process described by Puccio et al. (Puccio G. M., 2012)

- Visionary thinking
- Dreaming
- Imaginary journalism
- Strategic thinking
- Sensing gaps
- Webbing
- Ideational thinking
- Playfulness
- Evaluative thinking
- Avoiding premature closure
- Contextual thinking
- Sensitivity to one's environment
- Other people's view
- Tactical thinking
- Tolerance for risks
- Openness to novelty
- Tolerance for ambiguity
- Tolerance for complexity
- Diagnostic thinking
- 5Ws and an H (who, what, where, when, why, how)
- 4Is (Influence, imagination, interest, immediacy)
- If-then process analysis
- Metacognition
- Mindfulness

APPENDIX C

LIST OF DIFFERENT THINKING SKILLS

Educators always justify their courses/content as evidence that we teach our students to "think." This is a fallacy – expecting students to learn how to "think" is analogous to teaching a young athlete how to learn baseball. One does not learn "baseball" – one learns the different skills used in baseball and then chooses which skills to use at appropriate times to master the game. Educators must identify what "thinking" skills we teach rather than teach them to think! Can anyone teach one how to think – or is the process of thinking innate within ourselves as human creatures? However, we can teach different thinking skills by identifying them and helping students understand the approaches and outcomes for each thinking mode.

Another observation about thinking that is prevalent in our education system is that the vast number of different types of thinking are, for the most part, described as "critical thinking."

> "Courses in critical thinking are generally designed to introduce students to various reasoning-related techniques. These courses frequently include the basis of formal logic – especially propositional logic – though this is not the only topic covered. In teaching critical thinking, we also teach students how to identify and avoid common fallacies, and we teach students how to assess inductive arguments…. [C]ritical thinking courses make clear that the methods of reasoning presented are supposed to be practical. Critical thinking is only one aspect of 'practical reasoning' or 'practical thinking.' (Weston, 2010)

Suppose one accepts that critical thinking is the pursuit of rational thinking. In that case, the concept of creative or design thinking may conflict with current teaching and evaluation models in traditional undergraduate education models, where students are pointed in the direction of facts and truths as we currently know them. The messaging and assessment of foundational undergraduate courses are, by tradition, a polarity of historical facts and conformity to innovation

and creativity -- focusing on critical thinking may limit one's ability to be creative or innovative without having the courage or skills/knowledge to think differently. It is for this reason that I present several different modes of thinking, not just to demonstrate that there are different modes but also to reflect upon how many each of us recognizes, let alone use, and to contemplate how many we identify as 'critical thinking,' rather than a particular form of thinking that may or may not be "critical" under closer observation.

Below are different kinds of thinking modes (a non-exhaustive list):

- **Additive**: capacity to flexibly work between concepts, strategies and representations over a wide range of contexts and domains
- **Affective**: the sense one makes of the environment around them about morals, ethics and personal values
- **Analytical**: a method for analyzing a problem and finding a solution (cause & and effect)
- **Analogical**: a problem-solving technique used by strategists to support ideation
- **Automatic/"Fast"**: almost an unconscious way of thinking on which we make quick decisions (Kahneman)
- **Combinatorial** (Einstein): ability to see specific connections and combinations between different forms
- **Computational**: thought process of formulating problems as steps or equations
- **Conceptual**: the ability to identify patterns/connections between the seemingly unrelated
- **Contextual**: involves a set of interrelated skills that increase the scope (or hinder success), depth and accuracy of issues, problems or conflicts
- **Convergent**: focusing on reaching one or few well-defined solutions to a problem
- **Creative**: ability to come up with solutions that are new or novel
- **Critical**: an intellectually disciplined process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and evaluating information gathered from, or generated by, experience, reflection, reasoning, or communication as a guide to belief and action

- **Design**: a non-linear, iterative process that teams use to understand users, challenge assumptions, redefine problems and create innovative solutions to prototype test
- **Diagnostic**: a cognitive process considering a wide array of factors which results in a way forward to a solution
- **Divergent**: a free-flowing, non-linear thought process used to generate creative ideas by exploring many possible solutions
- **Domain**: the ability to determine commonalities between intersection points of different concepts or ideas
- **Effective**: a mode where outcomes are predominant, rather than the process
- **Evaluative**: a cognitive process focused on the analysis, interpretation, and judgment of information to guide decision-making
- **Flexible**: the ability to think about things in novel and plastic ways in uncertain periods
- **Functional**: a reasoning process used in the construction and generalization of patterns and relationships
- **Ideational**: a process of creating and communicating new or novel ideas
- **Integrative**: involves taking different ideas and examining the problem they are trying to solve, with the end goal of opening up to new thinking and innovation
- **Irrational**: thinking in modes that defy logic in the extreme
- **Lateral**: taking a creative and indirect approach to problem solving
- **Metacognitive**: thinking about thinking in a purposeful way
- **Multiplicative**: a capacity to work flexibly and efficiently within an extended range
- **Negative**: the practice of focusing on the bad in any given situation
- **Polarity**: understanding the tension between two related components
- **Positive**: the practice of focusing on the good in any given situation
- **Recursive**: how one process, representation or idea is related to the next
- **Reasoned/"Slow**": requires/employs more deliberate, conscious mental effort
- **Rigid**: one's difficulty in dealing with unpredictable situations and outcomes
- **Semantic**: a cognitive process to determine common threads in various contexts
- **Strategic**: a rational process of analysis of critical factors influencing long-term goals
- **Systematic**: a process of building words, phrases and sentences to convey a message
- **Systems**: an approach of determining how individual parts interrelate to the whole
- **Tactical**: ability to analyze immediate situations and develop plans for short-term goals

- **Vertical**: taking a logical and direct approach to problem solving
- **Visionary**: ability to see possibilities, opportunities, and solutions that others don't
- **Visual**: Using a broad array of images in a cognitive process

APPENDIX D

AI RESPONSE TO THE QUERY "WHAT SKILLS ARE NEEDED TO EXPLOIT THE BENEFITS OF AI?"

The following was the response:

"*To effectively exploit the benefits of AI, a combination of technical and non-technical skills is required. Here are the key types of skills needed:*

***1. Technical Skills**:*

- ***Programming and Software Development**: Proficiency in languages such as Python, R, Java, and C++ is essential for developing AI algorithms and applications.*

- ***Machine Learning and Deep Learning**: Understanding the principles and methods of machine learning, including supervised and unsupervised learning, neural networks, and deep learning frameworks like TensorFlow and PyTorch.*

- ***Data Science and Analytics**: Skills in data collection, cleaning, processing, and analysis, as well as knowledge of statistical methods and tools like SQL, Excel, and data visualization software.*

- ***Algorithm Design and Development**: Ability to design, implement, and optimize algorithms that underpin AI systems.*

- ***Knowledge of AI Frameworks and Libraries**: Familiarity with popular AI libraries and frameworks, such as scikit-learn, Keras, and OpenCV.*

***2. Domain-Specific Knowledge**:*

- ***Industry Knowledge**: Understanding the specific challenges, needs, and opportunities within the industry where AI is being applied, whether healthcare, finance, manufacturing, retail, etc.*

- ***Problem-Solving Skills**: Ability to identify problems that can be addressed with AI and develop practical solutions.*

***3. Soft Skills**:*

- ***Critical Thinking**: The capability to analyze complex problems, evaluate solutions, and make data-driven decisions.*

- ***Creativity**: Innovating and thinking outside the box to develop novel AI applications and approaches.*

- ***Communication Skills**: Effectively communicating technical concepts to non-technical stakeholders, including writing reports, creating presentations, and collaborative teamwork.*

- ***Ethics and Responsibility**: Understanding the ethical implications of AI, including issues of bias, privacy, and societal impact, and ensuring AI is developed and used responsibly.*

***4. Business and Management Skills**:*

- ***Project Management**: Managing AI projects from inception to deployment, including resource allocation, timeline management, and coordination with various stakeholders.*

- ***Strategic Thinking**: Aligning AI initiatives with business goals and understanding the long-term implications of AI investments.*

- ***Change Management****: Facilitating the integration of AI into existing business processes and managing the associated organizational changes.*

By combining these skills, individuals and organizations can maximize the potential of AI, driving innovation and achieving significant advancements in various fields."

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I hereby grant permission to the Department of Creativity and Change Leadership, Center for Applied Imagination at Buffalo State University permission to place a digital copy of this Master's Project: *Catching Up to Yesterday: An Argument for a Practical Application of Creativity for Inspiring Change from a Content-Based Course Delivery to a 21st Century Skills Based Delivery* as an online resource.

Darren Chapman
Name

May 5th, 2024
Date