

# Building a Growth Mindset Toolkit as a Means Toward Developing a Growth Mindset for Faculty Interactions with Students In and Out of the Classroom

## Building a Growth Mindset Toolkit for Faculty

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### ABSTRACT

During the spring semester of the 2021 academic year, a group of faculty gathered as part of a Growth Mindset Faculty Community of Practice (GM-FCoP) to understand how to use a growth mindset to positively impact students in their courses, through mentoring and in daily conversations. Grounded in Carol Dweck's seminal works on theories of intelligence, a growth mindset asserts that skills can be developed over time and views challenges as opportunities for growth and future success. This contrasts with a fixed mindset which views skills as set at birth with little hope for development. This notion of a fixed mindset also contrasts with the essence of our work as faculty and educators where we strive daily to positively influence our students' successes, learning and skill development. Yet, embracing a growth mindset over a fixed mindset can prove challenging. Learning about a growth mindset serves as an effective starting point for faculty, with next steps revolving around actively generating their own knowledge toward an overarching goal of applying the growth mindset concepts in their coursework as well as while mentoring students. This experience paper outlines the GM-FCoP's creation of a Growth Mindset Toolkit to serve as a resource for faculty as they foster and promote a growth mindset with students in formal settings such as in the classroom and in mentoring sessions, as well as informal settings such as office hours and general conversations and interactions. Faculty developed approaches for a growth mindset are highlighted along with leadership reflections and next steps.

### CCS CONCEPTS

• Social and professional topics; • Professional topics; • Computing education; • Informal education;

### KEYWORDS

Growth Mindset, Fixed Mindset, Faculty Development

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## 1 INTRODUCTION

In higher education institutions, faculty aim to provide effective support for students. As part of this it is important to recognize that each student is a unique individual and may approach a situation, especially challenges, with a different response. Two such responses include a growth and a fixed mindset and stem from theories of intelligence as grounded by Carol Dweck [1], [2]. A growth mindset suggests that challenges are used as a launching point for future success while a fixed mindset suggests that challenges present insurmountable barriers to success. A student approaching an academic challenge from a growth mindset might view feedback and advice from faculty as a means towards improving their skills and abilities. Alternatively, a student with a fixed mindset might consider this feedback and advice as an indication they are failing and there is nothing that they can do to change the situation.

While the student's mindset is important in their own actions and pathways forward, it is also critical to consider the faculty influence on students. Canning, Meunks, Green and Murphy analyzed self-reported mindset beliefs of STEM faculty as a predictor of student performance of 150 professors and more than 15,000 students across 634 STEM courses [3]. They concluded that faculty mindset beliefs have important implications for the classroom experiences and student achievement, particularly underserved minority students in STEM. While a growth mindset may come naturally to some, it may not be as natural for others. Yet the very essence of a growth mindset suggests that skills are not solely innate, but can be learned through appropriate processes, hard work and perseverance, especially during struggles and challenges.

Working towards the goal of developing a growth mindset among our faculty as a path toward fostering success with our students, a Growth Mindset Faculty Community of Practice (GM-FCoP) was formed in January 2021 in a College of Computing at a four-year private technical university in northeast United States. The GM-FCoP served as one part of a larger National Science Foundation grant titled ENhancing Growth-mindset Academic Experiences

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(ENGAGE) which aims to increase the number of academically talented, economically challenged students entering the computing workforce by using a multifaceted approach toward developing a growth mindset among computing instructional faculty, career instructional faculty, mentors and students. The GM-FCoP consisted of seven full-time College of Computing instructional faculty members (two of whom served as coordinators of the community and also as authors of this paper), one faculty administrator, and three adjunct faculty who teach Career Preparation courses in the College of Computing before students embark on their first co-op work experience. All of the GM-FCoP members also serve in mentoring roles, albeit formal or informal, for students in their classes and in the college as a whole. The GM-FCoP met weekly via Zoom during the spring semester to learn about embracing and fostering a growth mindset as well as identifying and shifting away from a fixed mindset [4]. The first eight meetings focused on readings, discussions and activities to increase awareness of growth and fixed mindsets in an educational context. After these foundational meetings, the GM-FCoP was ready to evolve towards actively generating their own knowledge with an overarching goal of applying the concepts learned through their own classroom approaches (materials, activities, lectures, exams, assignments) as well as mentoring students [5]. This experience paper focuses on the GM-FCoP's creation of a Growth Mindset Toolkit to serve as a resource to support faculty as they foster and promote growth mindset in students in formal settings, such as in the classroom and mentoring sessions, as well as informal settings like office hours and general conversations and interactions.

## 2 RELATED WORK

### 2.1 Communities of Practice

A community of practice, proposed by Lave and Wenger [6-8] offers its members the opportunity to learn and share knowledge about a domain through social, collaborative experiences. The community can include members with varying levels of knowledge and experience in the respective domain. More experienced and knowledgeable members are able to share what they have learned with less knowledgeable and experienced members. The goal is that through social learning, the overall knowledge of the community is advanced [7]. As the knowledge of a community advances, it may become important for the group to document and memorialize what has been discovered. Wenger promotes the idea of a “communal memory that allows individuals to do their work without needing to know everything” [7, p. 46]. The documents generated by community members as “communal memory” provide not only references for current members, but also provide a historical reference for future members to utilize and build upon.

### 2.2 Growth Mindset

While many resources exist around fixed and growth mindset, Brock and Hundley's book, *In Other Words: Phrases for Growth Mindset: a Teacher's Guide to Empowering Students Through Effective Praise and Feedback*, served as a primary resource for dialogue and learning development during the GM-FCoP [9]. Also grounded in Dweck's work [1], Bock and Hundley outlined several key growth

and fixed mindset points that were emphasized during the community meetings and which also served as identifiable approaches in the Growth Mindset Toolkit, and they are highlighted here:

- **Shaming versus empathy** - empathy can be an antidote to shame whereby shame will likely instill a fixed mindset as it creates a situation where the person being shamed sees their mistakes or errors as an indicator of failure that limits their future success. Instead, working toward a classroom or conversation space that instills empathy and understanding of others' perspectives can foster a growth mindset as students are able to better see a path forward. This is not to suggest that high standards and expectations should not be maintained (discussed in a subsequent bullet), but merely that struggles are met with empathy to encourage growth.

- **Person/outcome versus process praise and critique** - growth mindset values process more than a specific outcome. While outcomes and progress must be addressed and expected (see following points), the emphasis here is on the process as a means toward the outcome rather than simply the outcome in and of itself or a specific skill held by the person. In this way, the value of the process is more deeply learned and understood

- **Relationship building** (what can we learn from students) alongside students as decision makers. Professors and educators consider involving students as part of the process for making decisions and providing direction for the class.

- **Maintaining high standards** - this is often addressed as a growth mindset myth and stands to reason as empathy and normalizing mistakes is commonly conflated with lowering standards. However, encouraging a growth mindset is precisely the opposite as goals revolve around continuous growth, progress and advancement, all leading to success.

- **Expecting outcomes and progress rather than just effort** - again, often addressed as a growth mindset myth, effort alone does not serve to reach goals and move toward progress. Outcomes must be expected, but with a growth mindset that acknowledges the benefits of challenges, struggles and failures as the path toward success.

- **Valuing and normalizing mistakes** - a growth mindset not only normalizes mistakes as part of everyday experiences and learning, but also pushes further to value mistakes as a necessary component of learning and growth.

- **Positive interdependence** - a growth mindset environment values positive interdependence by establishing a community of learners whereby all the participants, both the instructor and the students, are working together toward both group goals and personal or individual goals. This particularly aligns with relationship building as previously identified.

## 3 THE TOOLKIT

One author, also serving as grant and GM-FCoP leadership, designed a Growth Mindset Toolkit framework to align with the three faculty roles previously outlined: (a) computing instructor, (b) career instructor and (c) mentor. Using a spreadsheet format to organize and capture faculty ideas, experiences and examples, the structure provided a framework to consider how to integrate growth mindset approaches or techniques that had been learned

	B	C	D	E
1	Area/Assignment/Activity	Fixed Mindset Issue Being Addressed	New Growth Mindset Technique	GM Approach (choose one or more): Shaming vs. sympathy vs. empathy Person/outcome vs. process praise and critique Relationship building (what can we learn from students) alongside students as decision makers (Authority in Maintaining high standards (one of the growth mindset myths) Expecting outcomes and progress rather than just effort (one of the growth mindset myths) Valuing and normalizing mistakes Being empathetic – understanding students' perspectives Positive interdependence – establishing a community of learners (aligns with relationship building and Authority) Any other key points that you see as relevant and important
9	assignment grading	limited/no feedback beyond grade earned	offer acknowledgement of work/effort put forth, supply encouragement and opportunities for remediation	process praise and critique vs person/outcome praise
10	assignments	This is new to me, I'm not confident that I can do it	Scaffolding the expectations of assignments related to a new topic. First assignment, grade based on effort/completeness, not on correctness. Subsequent assignments each raise expectations until the level for assessment is reached.	valuing and normalizing mistakes; expecting outcomes and progress rather than just effort
11	communication	This is new to me, I'm not confident that I can do it	Communicate to the students that you understand that they are all learning this material and that your expectation is not perfection, but continued growth which will come with work and effort. Emphasize the power of "yet".	relationship building; expecting outcomes and progress rather than just effort; valuing and normalizing mistakes; empathetic; positive interdependence
12	grading rubric	This is hard, I'm not sure what I'm supposed to do	Communicate that the grading rubric is yet another tool for them, to emphasize what should be in their exams / assignments.	expecting outcomes and progress rather than just effort
13	assignments	I'm not sure how this is supposed to work	Demonstrate the end result, don't just give the expectation that it should work. Perhaps even demonstrate errors.	valuing and normalizing mistakes; expecting outcomes and progress rather than just effort
14	assignments	This is new to me, I'm not confident that I can do it	assignments can be submitted multiple times until they are correct, receiving corrective feedback each time	

Figure 1: Programming/Computing instruction growth mindset toolkit snapshot

as part of the GM-FCoP. Faculty were asked to add in a particular area, assignment or activity where they could shift their own mindset from fixed toward growth or where they could foster an environment that encouraged a growth mindset. In addition to identifying the area/assignment/activity, faculty were asked to include (a) the fixed mindset approach that currently exists or has been observed, (b) the new growth mindset technique and (c) the growth mindset approach as discussed during the GM-FCoP. These growth mindset approaches were outlined in the previous section and were listed in the Growth Mindset Toolkit as: Shaming vs. empathy, person/outcome vs. process praise and critique, relationship building, maintaining high standards, expecting outcomes and progress rather than just effort, valuing and normalizing mistakes, being empathetic, positive interdependence and any other relevant key points. As previously described, these approaches were identified from the literature [9] and used as part of the GM-FCoP that served to guide weekly discussions. The last bulleted approach, any other relevant points, was intended to leave space for GM-FCoP participants to include their own respective growth mindset ideas and approaches.

Figure 1 demonstrates some of the examples outlined in the 'Teaching' category with a focus on assignments and grading. Faculty identified areas of opportunity for a growth mindset in grading. For example, rather than providing little or no feedback on assignments and simply providing a grade that may be anywhere on a spectrum from mastery to failing, a growth mindset approach would be fostered by providing feedback that acknowledges the effort and work put into the assignment along with next steps toward progress, regardless of the mastery level. This approach specifically fosters a growth mindset by emphasizing 'process praise' rather than person praise.

Faculty also identified an opportunity to reward effort toward mastering learning of content and concepts. For example, in row 9 in the Figure 1 table, one GM-FCoP member expressed an idea that initial course assignments could be graded on effort rather than

correctness. In terms of growth mindset approaches, this fosters an environment where mistakes are normalized and accepted as part of the process toward learning. This contrasts with a fixed mindset where mistakes would be viewed as hurdles that cannot be overcome and might serve as a roadblock toward progress and learning.

Normalizing mistakes was also noted in the career instruction sheet with examples seen in Figure 2. In line 2 of Figure 2, one faculty member outlined an activity where a panel of alumni presents to their career preparation class to discuss experiences of searching for and working in a co-op position. The fixed mindset issue being addressed is the idea of dispelling the myth that only the highest achieving students with innate or natural ability in computing are able to obtain co-op positions or get the best co-op positions.

In dispelling this fixed mindset myth, the new growth mindset technique centers on recruiting a diverse (diversity in GPA, gender identity, type of work experience, etc. in addition to racial diversity) panel of alumni who have demonstrated resilience through failures and challenges in order to persevere. The panel would be encouraged to share stories of their trials and tribulations in working through the process of getting a co-op and their experiences on the job. Again, this demonstrates the notion of normalizing mistakes and failures and valuing them as stepping stones toward success.

Another career example (not seen in Figure 2), involved practicing job interviewing with peers, giving and getting feedback and seeing the process from the recruiter's view (role-play) in order to understand that weaknesses are opportunities for growth and self-improvement. This technique also addressed normalizing mistakes while setting up a community of learners in order to build relationships. Career instructors identified this approach to address the fixed mindset statements they regularly heard from students which include, "Interviewing is scary," "I am not smart enough," "I freeze under pressure, get tongue-tied," "I don't know enough about my field to interview well, much less take a co-op performing duties

	B	C	D	E
1				<b>GM Approach (choose one or more):</b> Shaming vs. sympathy vs. empathy Person/outcome vs. process praise and critique Relationship building (what can we learn from students) alongside students as decision makers (Authority) Maintaining high standards (one of the growth mindset myths) Expecting outcomes and progress rather than just effort (one of the growth mindset myths) Valuing and normalizing mistakes Being empathetic – understanding students' perspectives Positive interdependence – establishing a community of learners (aligns with relationship building and Authority) Any other key points that you see as relevant and important
	<b>Area/Assignment/Activity</b>	<b>Fixed Mindset Issue Being Addressed</b>	<b>New Growth Mindset Technique</b>	
2	Co-op Prep Class Lesson- responding to fixed mindset triggers	Students have negative self-talk about the co-op search process. "I am not skilled enough for a company to want to hire me over others." or "I keep applying and I don't hear anything back, there's nothing more I can do."	Have students present, or have some pre-set fixed mindset triggers about the co-op search process. This could happen in the beginning of class, or during each module to address challenges along the way. This could be done anonymously. In small group work, students can review the triggers and develop responses with a growth mindset. Instructor should promote discussion by asking students questions like, "With this mindset, what is the focus?" and, "How could you respond with growth mindset, and create solutions to the challenge?" Follow up group with a personal reflection. This type of lesson would be easier to execute in-person, but can be adapted to synchronous online learning using a white/Jamboard	Addressing negative self-talk, self awareness, valuing and normalizing mistakes/failure
3	Co-op Prep Class Lesson - Student panel	"only the highest achieving students get co-ops"	Recruiting a diverse panel, focusing on students who have demonstrated a growth mindset and persevered through failure/challenges. Consider many dimensions of diversity such as GPA, gender identity, race/ethnicity, type of work experience, etc. Require reflection after attendance and focus reflection questions on demonstrating growth mindset thinking.	valuing and normalizing mistakes/failure.
			Provide a short lecture/demonstration on a basic networking outreach using LinkedIn. Include both	
+   Teaching (programming + others)   Career   Mentoring				

Figure 2: Career preparation growth mindset toolkit snapshot

	B	C	D	E
1				<b>GM Approach (choose one or more):</b> Shaming vs. sympathy vs. empathy Person/outcome vs. process praise and critique Relationship building (what can we learn from students) alongside students as decision makers Maintaining high standards (one of the growth mindset myths) Expecting outcomes and progress rather than just effort (one of the growth mindset myths) Valuing and normalizing mistakes Being empathetic – understanding students' perspectives Positive interdependence – establishing a community of learners (aligns with relationship building and Authority) Any other key points that you see as relevant and important
	<b>Area/Assignment/Activity</b>	<b>Fixed Mindset Issue Being Addressed</b>	<b>New Growth Mindset Technique</b>	
2	Office hours - student wants to drop a class	focused on getting a C	language around process - relating how the modules build on each other (in programming I class as an example). We first learn to build GUIs and more advanced I/O, then work in concurrency (threading) but with GUIs and I/O. Then we build client-server applications that incorporate everything.	process vs. outcome
3	Programming Assignments and study methodology. Faculty often assume students know how to study and learn. a faulty assumption.	Student is overwhelmed with all the resources and assignments. Believes she can't learn programming so is not using resources.	work with student to develop a study/practice process including how to navigate and incorporate resources.	process vs outcome
4	Programming Assignments and study methodology.	Student: Can you suggest some other resources like books or online courses that I can use?  Faculty: This student already has access to so much - they just aren't willing to try and want easy answers.  Student: Just show me	Ask the student how they approach their homework. What do they use from the resources that are already available? What is it about the resources that are provided to you that don't work for you? What do you think would work better?	Shaming vs. sympathy vs. empathy Positive interdependence
+   Teaching (programming + others)   Career   Mentoring   Count: 5				

Figure 3: Mentoring growth mindset toolkit snapshot

required," and "why would an employer hire me? I have nothing to offer at this point."

In the mentoring sheet of the growth mindset toolkit, GM-FCoP members outlined several opportunities to emphasize process rather than outcomes as a means of fostering a growth mindset. As seen in Figure 3, one instructor described an opportunity to encourage a growth mindset with students during office hours. In the example in row 2 of Figure 3, the office hour discussion focuses on the fixed mindset aspect of praising or emphasizing a particular outcome rather than the process, in this case, getting a specific grade in a

course. The shift toward a growth mindset centers on language that underscores the importance of the process toward reaching a particular goal, that of understanding how the programming concepts tie together and build on one another.

Another example of process praise or development as a growth mindset approach (in contrast to outcome praise) is seen in line 3 in Figure 3. In this scenario, the activity revolves around the faulty assumption held by many that students already come to college knowing how to study and learn. This assumption can compound the feelings that students may experience as they are

faced with an overwhelming amount of resources to use for a particular assignment, project or learning module in addition to the number of assignments they are juggling. The GM-FCoP instructor identified this as an area where faculty could work with students to develop appropriate processes and practices for working through assignments as well as processes for how to navigate sifting through an immense number of resources and in turn incorporating those resources in their future processes and work.

## 4 REFLECTIONS AND CONCLUSION

Building a Growth Mindset Toolkit such as this can be useful to many differing student support roles, including faculty in classroom instructional roles, be it computing or career preparation as well as mentoring. Treating it as an evergreen document helps each faculty member, staff member and administrator add their own insights as well as expand their own ideals by reading and reviewing what the others have shared. Specifically, sharing students' impediments across these roles provided important insights for the community members. For example, computing faculty may not regularly recognize the stresses that students are experiencing as they search for a co-op position, yet engaging in dialogue about this during the GM-FCoP shed light on the issue in the context of approaching the problem with a fixed or growth mindset. Throughout the experience, the leadership team observed that the development of the Growth Mindset Toolkit empowered the GM-FCoP to collaboratively apply their knowledge to brainstorm fixed mindset issues that could be encountered in or out of the classroom and reframe the situation through a growth mindset lens. In this sense, the Growth Mindset Toolkit served as a means toward creating a communal memory for the community of practice members by documenting and memorializing what has been discovered. Of equal importance is the idea that the Growth Mindset Toolkit also provides a historical reference for future members to utilize and build upon [7].

In looking to the future, the Growth Mindset Toolkit can continue to serve as a resource to current GM-FCoP members as they enact a growth mindset in their classrooms and in their mentoring, but as a living document it can be updated as the knowledge and experience gained by GM-FCoP members continues to grow. The nearly 40 scenarios provided by the GM-FCoP to the Growth Mindset Toolkit were exceptionally valuable, well considered and grounded in decades of computing and career teaching and mentoring experience. In fact, many of the examples presented here likely resonate with faculty at all levels of experience and across many domains (and present a starting point in generating new ideas as well). They served the goals of (a) learning about growth mindset, (b) applying that knowledge to past situations and (c) articulating scenarios using distinct growth mindset language. These three goals were accomplished because the Growth Mindset Toolkit presented authentic and organic situational and domain-specific examples and scenarios for robust dialogue during GC-FCoP meetings. Yet another goal still was to enable faculty to innately and more deeply embrace, and even embody a growth mindset in their interactions with students moving forward. Toward this end, next steps for this aspect of the project include understanding how faculty are using the Growth Mindset Toolkit in practice, how it can be potentially

useful to them and how to continue to treat the toolkit as a living or evergreen resource and adding new examples as they arise and are addressed by faculty. Also important is understanding how continuing to use the Growth Mindset Toolkit can support faculty as they further embrace and more deeply enact a growth mindset in their classrooms and their mentoring relationships with students.

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