

McMaster Grand Challenges Scholars Program

Portfolio Guide

Introduction

This guide is intended to assist students in creating a portfolio that effectively portrays their journey through the Grand Challenges Scholars Program. A portfolio is not only a documentation of excellent accomplishment; it is an opportunity for the author to express how these incredible experiences have prepared them for the future. As such, portfolios require deep, authentic, and meaningful reflection.

Deep: Reflection requires more than a description of an experience and the immediate reaction. Reflection often involves deep comprehension of an experience, the evoking of emotions, as well as the resolution of those feelings and how to best move forward.

Authentic: Reflection is a very personal process and students are encouraged to describe their events honestly and genuinely. More often we learn from our mistakes than from our successes, and it is perfectly acceptable to discuss how the negative aspects of an experience helped students learn and move forward.

Meaningful: The five competencies of the Grand Challenges Scholars Program are the learning outcomes that successful students are expected to achieve. With the end in mind, reflection should be clear and focused in the journey that students are taking in achieving the competencies.

While the formatting of each portfolio is left to the author's discretion, the content of the portfolio is to be aligned with the specifications of this guide.

Contents

The contents of the portfolio are as follows:

- Foreword
 - Introduction of the student (name and program)
 - Why the student has joined the Grand Challenges Scholars Program
 - Which United Nations Sustainable Development Goal is of most importance to the student, and why
 - Post-graduation Plans
- Reflections – The Five Competencies
- Reflection – ACTIVE Project

The Five Competencies

Competency	Description	Outcomes
Discover + Create	<p>In demonstrating this competency, a student must complete a research/creative experience, such as a design project or research paper, focused on contributing to one of the United Nation's Sustainable Development Goals.</p> <p>The ability to conduct research professionally, ethically, and effectively is an important foundation in synthesizing engineering solutions. By conducting thoughtful research, we can identify critical challenges and necessary strategies with precision.</p>	<p>The outcomes of this competency include:</p> <ul style="list-style-type: none"> • Conducting thoughtful review of existing knowledge to inform one's practice • Evaluating/analyzing current practice to identify areas of contribution • Synthesizing robust solutions/proposals to ambiguous complex problems
Integrate + Solve	<p>In demonstrating this competency, a student must exhibit an understanding that engineering solutions require more expertise than only that of an engineer to be successfully implemented into society. Teams in the professional world consist of members from differing areas of expertise and lived experiences. The ability to move forward alongside colleagues and identify how they can fill the gaps in our own expertise is critical to the success of an effective team member.</p>	<p>The outcomes of this competency include:</p> <ul style="list-style-type: none"> • Collaborating effectively with colleagues from other disciplinary backgrounds • Recognizing how expertise from other disciplinary backgrounds can remedy gaps in one's own expertise • Identifying the expertise needed to create a feasible solution to a complex problem
Business + Innovate	<p>In demonstrating this competency, a student must display an understanding that solutions to complex problems require viable financial models in order to be successfully implemented into society. Solutions require stakeholders, most of whom will need to make monetary contributions in order to successfully implement these solutions. When proposing solutions to complex problems, it is critical to identify ongoing sources of income and expenses in order to create a</p>	<p>The outcomes of this competency include:</p> <ul style="list-style-type: none"> • Describing the role of stakeholders in a complex problem • Identifying sources of start-up costs, operating costs, and/or revenue in a robust solution • Creating a viable financial model for a

	plan that will be financially viable throughout the lifetime of the solutions.	solution to a complex problem
Global + Diverse	<p>In demonstrating this competency, a student must convey an understanding that solutions to complex problems require a critical examination of the culture where they are to be implemented in order to ensure these solutions are ethical, desirable, and viable.</p> <p>As a citizen of a global community, it is important to recognize and learn from different cultures that have functioned effectively for centuries. We do this for the purposes of integrating new knowledge into our own, as well as informing our practice for when we are actively involved in other cultures.</p>	<p>The outcomes of this competency include:</p> <ul style="list-style-type: none"> • Identifying unique values/principles from other cultures • Incorporating aspects of another culture into one's own practice • Adapting one's practice to work effectively in another culture
Citizen + Community	<p>In demonstrating this competency, a student must demonstrate an understanding that engineering solutions primarily serve the best interests of people and society.</p> <p>The role of a global citizen is to maintain or improve the wellbeing of the public through action. However, when we decide to act, that action comes at the cost of refusing many other actions. This concept of cost can be extended to generating solutions. It is our responsibility to weigh the cost of our actions in order to determine options that provide the greatest benefit in exchange for the least amount of negative consequences.</p>	<p>The outcomes of this competency include:</p> <ul style="list-style-type: none"> • Identifying the role of a responsible citizen • Reflecting on intrapersonal development (i.e. empathy, reciprocity, etc.) • Describing the qualitative and quantitative benefits and costs of a solution/service

ACTIVE Project

An ACTIVE Project aligns exercise of all Five Competencies in one immersive experience. While the specifics of an ACTIVE project may change from student to student, a project must meet several requirements.

Criteria	Description
Attainable	A project is completed in consultation with a mentor that guides the student towards a feasible implementation in the real world.
Cultural	A project exhibits a thorough consideration of the culture in which it is to be implemented.
Technical	A project leads to a proposal/prototype that is mechanical, physical, or scientific in nature.
Impactful	A project leads to a proposal/prototype that clearly contributes towards one of the UN's Sustainable Development Goals (SDG).
Viable	A project leads to a proposal/prototype with a sustainable financial plan.
Experiential	A project must take place in an experiential learning environment, with a substantial time commitment of at least 60 hours over the course of the project.

Reflections

Submissions

Reflections submitted by students must address the following areas:

Description

A detailed description of the experience(s), including the student's role, the number and roles of partners/colleagues, and the demographic of involved parties.

Feelings and Goals

The student's feelings at the beginning of, and/or throughout the experience(s). If the experience was voluntary (i.e. not a required course), the student's goals of the experience are to be included.

Evaluation

The initial reaction to the student's experience(s) in relation to perceived success and meeting expectations. Views, biases, values, and/or intentions are considered. Areas of success and areas of improvement are identified.

Analysis

A discussion of preparedness (or lack thereof) for the experience(s); Past relevant literature, knowledge, or experiences that prepared the student are identified and the relationships are explained. A discussion of how this experience has contributed towards the program outcomes as well as the student's personal goals is included.

Conclusion

A description of the transferable skills and techniques gained/exercised during the experience(s) that can be used in the future in both similar and different contexts.

Evaluation

Reflections will be evaluated against the rubric outlined below.

	Foundational	Visionary	Scholarly	ACTIVE Project
Temporal Progression	X	X	X	X
Important Aspects	X	X	X	X
Connection to Academic Theory	X	X	X	X
Relating to Other Contexts	X	X	X	X
Personal Thoughts and Feelings		X	X	X
Cause-and-Effect Relationships		X	X	X
Other Possible Responses			X	X
Planning and Future Practices			X	X
Word Count Goal	500	1000	1500	1500

A successful reflection will meet all of the criteria listed under the corresponding category.

Temporal Progression

- Relevant information is recalled from memory
- Relevant information is organized thoughtfully, and events are described in temporal progression

Important Aspects

- The most important details of the experience are identified and explained
- Key themes and main points are summarized succinctly

Connection to Academic Theory

- Details from the experience are compared with theory
- Methods of adapting theory into practice are discussed

Relating to Other Contexts

- At least one other related experience is provided
- The relevance of the related experience(s), and common ideas are explained
- All related experiences are compared and contrasted to identify similarities and differences

Personal Thoughts and Feelings

- Views, biases, values, and/or intentions that influence the thoughts/feelings about the experience are identified

- Discussions of thoughts and feelings are integrated cohesively into the reflection
- Key thoughts and feelings are summarized and rationalized through explanation of the experience in relation to learning

Cause-and-Effect Relationship

- A cause-and-effect model (composed of past experiences, this experience, and outcomes) is discussed
- The results of the experience are judged/critiqued based on personal criteria/standards

Other Possible Responses

- At least one aspect of the experience that is worth revisiting is identified
- An alternate course of action for that aspect is proposed and rationalized as meeting personal criteria/standards
- The outcome of that alternate course of action is judged

Planning and Future Practices

- Ideas for future practices are generated
- A plan for future, similar experiences is proposed
- Benefits of this experience are outlined clearly

Resources

[1] Reflective Learning Framework Handout - <https://asp.mcmaster.ca/wp-content/uploads/2019/08/RLF-Handout-1.pdf>

[2] Reflective Learning Framework Video Guide - <https://www.youtube.com/watch?v=WFoITC5ETWM>

[3] Reflective Learning Framework Guide - <https://asp.mcmaster.ca/wp-content/uploads/2019/02/The-Reflective-Learning-Framework.-A-guide-for-students-and-educators.-v2.2.-FEB-2019.pdf>