DEVELOPING AND IMPLEMENTING A PLANETARY GEOLOGY COURSE FOR ENGINEERS (PGCE) AT THE JET PROPULSION LAB

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INTRODUCTION

The Mars 2020 rover mission is a collaborative effort between many different groups. This mission has several main objectives, one of them focusing on acquisition and caching of Martian rocks. This task has never been attempted before due to the complexity of building and testing a robot that could core and remove samples. Effective communication between mechanical engineers and geologists of the GeoAnalogs team is imperative for success.

The problem I am aiming to solve is that engineering and planetary geology rarely cross paths in traditional learning environments. The in-situ planetary geology exploration being attempted by this mission is a unique setting where engineering meets geology. There are vast differences between geology and engineering both in practice and in culture. Essentially, the people taking the PGCE are building a rover geologist and the information they take away from it will hopefully influence the way they see the environments that their mechanisms need to work in.

BACKGROUND RESEARCH

I was tasked with interviewing project scientists and members of the engineering team to better understand the context for which the PGCE will be serving. Depending on their role, I asked about their experience with geology, where they have seen communication breakdowns about their biggest challenges and how they envision the PGCE. These nine interviews served as my most useful resource. I have included a chart which shows the most requested topics. These were then given priority when designing the PGCE.

GEOANALOGS MULTI USER TOOL (GAMUT)

GAMUT is a series of pages on JPL-Wired with relevant information regarding rocks currently being tested. This source provided the most specific information which is not available anywhere else. I was able to incorporate data from rock strength tests and their effects on “core-ability.” Pictures of test samples and methods were also available from GAMUT.

READINGS

A lot of time was spent finding and reading books that could provide background information on planetary geology. I found it effective to combine elements from a geology textbook and a planetary science textbook in addition to books dedicated to specific topics such as volcanism, planetary surface processes, and Martian environments.

PGCE SET UP & GOALS

The PGCE consists of a one-hour summarizing presentation for managers and those that cannot commit to the longer course. The main course is three one-hour sessions that will progress over several topics. Powerpoint will be utilized for both sessions to include videos, picture and text. There is also a series of online documents that cover each topic in detail. These will be used when a new employee or intern is hired as training and reference materials.

OVERCOMING ISSUES

INTERNET RESEARCH

“The internet proved to be a very difficult resource due to several reasons: 1) No information for specific topics, ex. Coring in a non-construction context, 2) Incorrect or conflicting information, 3) Unreliable sources. I overcame this by relying solely on NASA websites when doing internet research.

TECHNICAL DIFFICULTIES

Formatting the presentations in powerpoint was more difficult than expected. Embedding videos was a constant source of trouble. They would go defunct every few days, causing me to spend time re-downloading and embedding. I overcame this by reformattting videos and relying more on pictures.

ORGANIZATION

Generally, finding the flow of the PGCE was difficult. I first had to decide which topics to include because of limited time. There needed to be a logical progression through a topic and between topics. Most of my editing time was devoted to improving the transitions so it felt natural and progressed in a logical manner.

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REFERENCES


