# Inquiry Based Action Plan

*"Would you tell me, please, which way I ought to go from here?"*
*"That depends a good deal on where you want to get to," said the Cat.*
*"I don't much care where –" said Alice.*
*"Then it doesn't matter which way you go."*

*Alice Through the Looking Glass,*
*Lewis Carroll*

**Learning Outcomes:**

- To engage in professional growth through an inquiry learning process.
- To identify best practices in online learning.
- To use your learning to contribute to your current or future teaching.

## Identify the key topics or contexts of interest for an inquiry

## Identify a central inquiry question related to online learning.

## Impliment a plan of action informed by research.

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| **Proposed Plan Approved By**: |
| **Date Approved:** |

# 1. Identify Key Topic of Interest and Context

Key Topic: Remote laboratories and other forms of distance science experimentation.

Context: Within Science programs (Biology, Chemistry and Physics) authentic learning experiences are created using laboratory exercises, experiments and sometimes science fairs. Often, this requires specialized equipment in laboratories within the school, as well as occasionally requiring specific staff to run the laboratory.

The fully-online and asynchronous models of distance education would not allow for face-to-face science experimentation in the traditional sense. I feel that laboratories are an integral part of Science education and wonder what solutions are available for distance Science educators and students.

# 2. Identify a Central Inquiry Question (related to your topic, context)

**Central Inquiry Question:**

What are the ways that an authentic scientific experience, either through experimentation or through other methods, can be created in an online and/or asynchronous environment?

# 3. Design and Implementation

**Design an action plan for your inquiry question by:**
**a)** identifying relevant sources of information and background knowledge (i.e. primary and secondary sources, research studies, people, courses, associations, units or programs of study, contexts, relevant theories of teaching and learning, etc.)

**b)** creating "*Specific Actions*" i.e. What will you do to gather the above information? (eg. read journal article entitled ____; speak with ____; watch video entitled ___; etc.)

| **1. Note Your Central Inquiry Question here.**<br>What are the ways that an authentic scientific experience, either through experimentation or through other methods, can be created in an online and/or asynchronous environment? | |
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| **2. (a) Briefly summarize your research and note your 3 sources here. Use APA Style.** | **(b) Specific Actions** |
| **1.**<br>Sauter, M., Uttal, D. H., Rapp, D. N., Downing, M., & Jona, K. (2013). Getting real: The authenticity of remote labs and simulations for science learning. *Distance Education, 34*(1), 37-47. Retrieved from http://ezproxy.viu.ca/login?url=http://search.ebscohost.com.ezproxy.viu.ca/login.aspx?direct=true&AuthType=ip,cookie&db=eric&AN=EJ1005246&site=ehost-live; http://dx.doi.org.ezproxy.viu.ca/10.1080/01587919.2013.770 | I read the journal article referenced to the left that was retrieved from the ERIC database. |

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| 431<br>• This article studied student perceptions and engagement when using remote laboratory activities and simulations.<br>• Both remote laboratories and simulations were effective at teaching content, but only students using remote laboratories had an "experience of doing science labs" (44).<br>• In order engage students in scientific inquiry, the online experience must be grounded in reality (remote laboratories with strong visualizations of the process).<br>• Students using simulations had less of an experience of "doing science" but tended to concentrate on theory and performed better on assessments of content.<br>• Students using simulations tended to be less able to identify quality of data, and tended to think of the experience as unscientific because they were not collecting their own data.<br>• Overall, remote laboratories were able to create a stronger "scientific experience" and students were more interested in repeating the experience and testing hypothesis. | |
| **2.**<br>Mawn, M. V., Carrico, P., Charuk, K., Stote, K. S., & Lawrence, B. (2011). Hands-on and online: Scientific explorations through distance learning. *Open Learning, 26*(2), 135-146. Retrieved from http://ezproxy.viu.ca/login?url=http://search.ebscohost.com.ezproxy.viu.ca/login.aspx?direct=true&AuthType=ip,cookie&db=eric&AN=EJ923972&site=ehost-live; http://www.informaworld.com.ezproxy.viu.ca/openurl?genre=article&id=doi:10.1080/02680513.2011.567464<br>• This article studied the use of hands-on laboratories conducted in fully-online courses. The students were given instructions and/or kits to help complete experiments on their own during the course of the online science course.<br>• Based on samples of student submissions collected over a two year period, the authors concluded that the students were able to "[utilize] the processes of science when conducting experiments from their own locations" (144).<br>• Student frequently did not question beyond the constraints of the activity, so it is difficult to determine if there was inquiry happening.<br>• The authors note that the students would be able to repeat and modify the experiments many times and deeper learning could be developed.<br>• An important (though mostly absent) aspect of online science courses is the development of scientific discourse between students through discussion boards. | I read the journal article referenced to the left that was retrieved from the ERIC database. |

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| **3.**<br>Crippen, K., Archambault, L., & Kern, C. (2013). The nature of laboratory learning experiences in secondary science online. *Research in Science Education, 43*(3), 1029-1050. doi: 10.1007/s11165-012-9301-6<br>• Unlike the above two articles, this article specifically focuses on the secondary education context. It focused on exploring what online laboratory experiences generally look like, and what barriers exist for different experiences.<br>• Generally instructors tended to use hand-on laboratory kits and simulations to instruct students.<br>• These types of experiments tended to be student-centered and focus on data collection, because all laboratory experiences were closely tied to curriculum outcomes.<br>• These hands-on and simulated laboratory experiences also tended to be strongly teacher-directed.<br>• Instructors expressed an interest in being able to be a part of the students' experiences in order to monitor and help develop the student laboratory experience.<br>• In a review of the available literature, the authors cite collaboration, access to remote tools, and co-creation and sharing of scientific artifacts between students are opportunities in online science instruction. | I read the journal article referenced to the left that was retrieved using Google Scholar. |

## Additional Information and Resources to Support the Inquiry Process

***NOTE:*** *You are not expected to design and complete a full blown research project (the sites below are more geared towards a full scale research project). The focus of this project is on identifying a potential area of interest and/or concern re: your professional growth regarding DL. Throughout the learning process you will have the opportunity to enrich an aspect of your teaching practice and will contribute to your OLTD community. The goal is not to become experts in research methodologies, data collection and analysis as that is well beyond the scope of this activity.*

- Teaching the Art of Inquiry
  http://socserv2.mcmaster.ca/~fss/inquiry/artofinq.htm
- Refer to the APA Style Guide in OLTD 501/Student Support Resources for citation formats. You may wish to download this to your OLTD folder for future reference or follow this link directly
- Here's a You Tube link as well for how to cite sources using APA Style.