

Formative Evaluation – One to One.

Scroll down for results tables. See page 12 for blank forms used.

Learner Characteristics. Four learners participated in the one on one evaluation of the Longitude and Latitude module. All four were college age students ranging from 19-21. No further educational data was given as longitude and latitude tend to be a lower grades skills that all America students tend to learn sometime in their educational history. Two of the learners were TCC first year students. One was a 2nd year student from FSU, and the third was not asked about his college attendance status.

It is worth noting that when requesting participants for this evaluation, each person was told that participants “weak on Latitude and Longitude or without knowledge about it at all” were being sought. Three of the four of the students initially stated being “weak” or “unsure” about longitude and latitude. (Out of the 4, two ranked their skills on a level 2 out of a 1 to 5 scale, with 1 being lowest). Due to the standardized nature of U.S. education, it is rare to find anyone in the adult population who has no knowledge at all of longitude or latitude.¹ After completing the pretest, it appeared that all four were able to accomplish basic longitude and latitude problems even though they confessed to guessing, using “math coordinates knowledge” or common sense. Despite this fact, at least two confessed to using their “common knowledge” or “math

¹ One volunteer who affirmed they knew nothing at all about longitude and latitude was unavailable the entire weekend despite agreeing to participate.

skills" to intelligently guess. Furthermore, three of the four learners stated that they really "learned" through the packet and that the subject made much more sense as a result of having done the module.

Despite the fact that it seems problematic that none of the learners were "new" to longitude and latitude, I believe the formative evaluation has in fact worked and turned up a significant fact about the characteristics of the target population I chose. The evaluation indicates that these learners are interested in the topic, more familiar with it than they at first suggest, and more in need of remediation. Were this a real world scenario, a decision would have to be made at this point if the product needed to be remarketed to this population as a "refresher course", a change in target population was necessary, or the entire project scrapped.

Procedures. (1) Each learner was met with one on one in a coffee shop setting. Each was given a \$7 Starbucks card for their time, since they were not known to myself (except the first learner). Participants were told to write on the learning module, underline unclear things, make notations and ask questions wherever necessary. Each was told to consider saying something about each page regardless of whether critical or complementary. Each was told that it was okay to be critical and that their goal was actually to help me find mistakes in the module so that it could be corrected before six other users tested the module out. Statements like, "Tell me if anything jumps out at you while you are doing the packet, such as something very pleasing, or something confusing."

Explaining the overall project and its origin in the FSU department gave ease of mind to most of the participants.

(2) Start times were taken for each of the four participants as they began. I chose to put motivation before pre-testing because the motivation section did not reveal any "instruction" and thus would not affect the pre-test results. Pretests were actually built into the module itself after three motivational pages and were followed by answers to the pre-test. The last learner became pressed for time and was thus told to skip the answer checking page for her pre-test and post test(as I could do this on my own).

(3) Each of the learners worked straight through the packet and did not seem compelled to make many comments about the packet on a page by page basis. I interrupted every few pages and asked how they felt, if they were bored, if they had any thoughts about the pages thus far. All of the learners agreed that the packet was clearly laid out. The only universally constant comments were on the quality of the photocopies (a few maps were less clear after copying). (Other individual comments will be shared later in the report).

(4) Each of the participants did look up from time to time to ask questions about an unclear page or question. When problems were identified they wrote it down on their packet and I made notations on a "master" copy as well.

(5) The post-test was built into the module along with the answers at the end. Three of the four checked their answers after finishing.

(6) When complete I handed the learners a follow up survey with several questions that had value rankings from 1 to 5. The survey packet also had some open ended questions. I did not feel it appropriate to ask them to fill out those as well as it seemed redundant after the survey. I asked some of the questions in an open ended format and looked for any "last thoughts" after taking the packet.

(7) Each of the participants took just over or just under an hour to complete the packet. Completion time was not collected for the fourth participant.

Data.

(1) Motivation. Three of the four learners expressed some delight in some part or another of the motivational pages. The second learner (Fred) seemed to skip quickly past the section but then stated, when asked, that he had read through them. None of the motivational pages were commented on as needed changes except for two spelling errors.

(2) Pre-test & Post-test. As mentioned earlier, the pretest for each of the participants turned out that they knew more than they thought they did about latitude and longitude. The overall result of the packet was that it revealed the learners perceptions about the phrase "longitude and latitude" as being more complicated than they thought. Three of the four learners were insecure about their ability to use longitude and latitude at all, even though it turned out this insecurity was unfounded.

PRE-TEST DATA						
Objective	Pre-Test item.	Learner 1	Learner 2	Learner 3	Learner 4	Total
1.1b	1 (Ent behv)	✓	✓	✓	✓	4 of 4
1.2d, 4.2a, 1.2e, 3.1a	2	✓	✓	✓	✓	4 of 4
1.1a, 4.0a,	3	✓	x	✓	✓	3 of 4
1.1, 1.2, 1.4, 2.1, 2.2,	4	✓	✓	x	✓	3 of 4
1.2a,	5	✓	✓	✓	✓	4 of 4
4.3, 4.4, 3.1, 3.2, 4.1, 4.2	6 (Term.Ob)	✓	x	✓	✓	3 of 4
4.3, 4.4	7	Knew How	Guessed	Knew How	Knew How	3 of 4
2.3, 2.4, 1.3, 1.5	8 (Term.Ob)	✓	✓	✓	x	3 of 4
1.3, 1.4, 3.0b, 2.3, 2.4	9	✓	x	✓	✓	3 of 4
	Total Right.	100%	67%	89%	89%	Avg. 86.3%
✓ = ANSWERED CORRECTLY, x=ANSWERED INCORRECTLY						

POST-TEST DATA						
Objective	Pre-Test item.	Learner 1	Learner 2	Learner 3	Learner 4	Total
	1	✓	✓	✓	✓	4 of 4
1.1, 1.2, 1.4, 2.1, 2.2,	2	✓	✓	✓	✓	4 of 4
1.1, 1.2, 1.4, 2.1, 2.2,	3	✓	✓	✓	✓	4 of 4
1.2a,	4	✓	✓	✓	✓	4 of 4
1.8a	5	✓	✓	✓	✓	4 of 4
1.2b,	6	✓	✓	✓	✓	4 of 4
1.2c, 2.1a	7	✓	✓	✓	✓	4 of 4
1.2d, 1.2e	8	✓	✓	✓	✓	4 of 4
2.3, 2.4, 1.3, 1.5	9	✓	x	x	✓	3 of 4S
2.3, 2.4, 1.3, 1.5	10 (Term.Ob)	✓	✓	✓	✓	4 of 4
4.3, 4.4, 3.1, 3.2, 4.1, 4.2	11 (Term.Ob)	✓	✓	✓	✓	4 of 4
2.3, 2.4, 1.3, 1.5	12	✓	✓ Found test problem.	✓	✓	4 of 4
	Total Right.	100%	89%	89%	100%	Avg. 94.5%
✓ = ANSWERED CORRECTLY, x=ANSWERED INCORRECTLY						

A comparison of pre-test and post-test results showed that even though learners knew more about the subject than they indicated when they were asked to participate, they all increased in score. Learner #3, who's scores appeared to have decreased, seemed to have made the mistake out of carelessness more so than not knowing how to do the problem.

(3) Qualitative feedback from participants. Overall, the participants were engaged in the module without indicating any boredom and sustained confusion (except when a few errors were found.) All participants seemed to enjoy the graphics, the layout and the flow of the module. Participants 1,2, and 4 made multiple verbal statements about how the module was "Really helping things make sense!" or "Longitude and latitude are really coming back to me," or "I'm not bored at all, I'm learning a lot."

All four of the learners got hung up on one particular issue. On page 16, the map did not have the 90' marking for *latitude* labeled because it needed to go in the same spot as the 180' for longitude. This threw off all four of the participants when it came to questions 4 and 6. Even though I put a parenthetical statement to clarify this, they seemed to miss it.

Learner 2 started drawing lines one each of the maps after he saw the lines drawn on page 13. I asked him if he did this because it helped or if he thought that was what the module was indicating for him to do. He said he thought that's what he was supposed to do. None of the other learners did this.

Each of the learners found a typographical error, or a problem with a question in the practice sessions.

Participants 1 and 3 conflicted with participant 2 on the value of page 19 where additional instruction is given on degree's, minutes and seconds. This page was created in response to the learner analysis. Early on one learner had asked about "What went between the lines" of longitude and latitude. This information was not part of the basic pattern of finding longitude and latitude, nor is it normally used by anyone not using some machine or computer. As a result it is never more than common knowledge. For this reason I did not include it in the pre-test or post-test. I have decided to leave it in. Learner 2's comment was more about the map on the bottom of page 19 than the value of the page.

Three of the participants indicated that the maps were a bit hard to read. This is more of a problem with photocopying and the challenge of fitting a world map onto a 8x11 paper. Since I did not pay for royalties on graphics, I had to go with what was available free online. This will not be changed with revisions because each of the participants read the maps despite this. The map on the bottom of 19 was confusing to learner 2. Again this is more of a problem of having it in photocopied black and white form rather than traditional topographic map color.

Finally, learners 1 and 2 (both male, the other two were female) seemed unclear about whether or not the number of degrees between lines of longitude

were the same for all maps or differed with different maps. This in turn caused the final practice problem on page 20 to be somewhat challenging. The feedback clarified the issue for them, along with comments from myself.

(4) Attitude Questionnaire.

ATTITUDE QUESTIONNAIRE						
Question	Rating Scale	Learner 1	Learner 2	Learner 3	Learner 4	Avg. Answer
How was the pretest in difficulty?	1=easy to 5=hard	3	2	2	3	2.5
How good were you at longitude and latitude before going through the module?	1= poor to 5= good	3 to 4 (From front page)	3	3	2	2.9
Did the pages of instruction on how to find long and lat clearly explain the necessary steps?	1 = no to 5 = yes	5	4	5	4	4.5
Did the motivational section motivate you?	1= no to 5= yes	5	5	4	5	4.75
Were there enough example problems.	1 = no to 5 = yes	5	5	5	5	5
Were there enough problems for you to practice	1=not enough 3 = just right 5 = too many	3	3	2 (Wanted harder ones)	3	2.75
Did the post test really test what you learned?	1= no to 5 = yes	5	5	4	5	4.75
Overall did you feel confident completing this booklet (Did you feel nervous about not being able to do longitude	1 = nervous to 5 =very confident	5 (Conflicts with first statements indicating a 2 or 3 level confidence)	2	4	4	3.75 (note possible error in column one)

and latitude?)						
Do you feel good about long and lat now? Can you use it?	1= Not Sure To 5 = yes!	5	5	5	5	5
Did the post test seem like a realistic test for someone your age and someone learning this material?	Yes or No and state why.	Yes. The post test put what I learned into application.	Yes	No. It was too easy.	Yes. Not sure why. Simple.	Mostly Yes.
Overall rating.	1 = poor To 5 = good	4	4	4	5	4.25

Revisions made. None of the feedback indicated the need for a substantial revision of any sections of the module. None of the participants responded positively when asked if there were too many problems or two little examples. Feedback indicated an overall satisfaction with the module. Because only learner 3 suggested a need for harder problems (after viewing page 19) the majority opinion will be gone with and no changes will be made.

The revisions made to the module will include:

- (1) a correction of the six or seven grammatical errors found by the four participants.
- (2) addition of 90' markings on the map on page 20. This, again, was were all four learners stumbled over questions 4 and 6. Fixing this should remove this issue.
- (3) "Cardinal directions " on question 1 of the pre-test was unclear to learner 2 and will be changed to "compass directions" to make the idea clearer.

(4) Question number 3 on page 14 needs to be changed from 100 degrees to 110 degrees. The change is simply because this was wrong and did not match the location of A on the map that went with the question.

(5) Question 1 on page 18 needs to be changed from longitude to latitude. Again this is simply because the question was wrong.

(6) Add the words "the country of Mexico" instead of just "Mexico". This phrase was not clear to learner 2 as he tried to answer this question. Mexico is not actually fully visible on the map and the question requires visualization. The additional words help the learner visualize what is necessary to answer the problem.

Apart from this there were no other things that needed changing. All participants communicated an overall satisfaction with the packet. Participants 1, 2, and 4 clearly suggested they were more confident with longitude and latitude having clearly learned the subject material better through the module.

In conclusion, if there were more time, I would have gone back and re-selected a younger age group as a target audience. The product could be very marketable for geography teachers except for the issue of copyright on the graphics (they were taken off the internet from various geography web sites). My choice to not work with middle schoolers (who have not yet learned this concept) is regrettable but makes sense in light of my desire to not have to get

written permission to enter the schools and overcome scheduling challenges and coordination with geography teachers during school hours.

DATA COLLECTION SHEET

I've created a lesson on latitude and longitude for adults. It was created for a graduate project in the FSU college of education. I am asking a total of 9 people to take it. **BY TAKING THIS YOU ARE HELPING ME MAKE THE PROJECT BETTER!!**

User Name: _____ Age: _____

Male/Female _____ Phone/Email: _____

What is the last educational level completed or the level you are at right now?

How competent are you with longitude/latitude (1 being the lowest)

1 2 3 4 5

How relevant do you think this material would be? Does relearning this material interest you at all?

1 2 3 4 5

YOU MAY WRITE IN THE BOOKLET. IF YOU FIND SOMETHING YOU DON'T UNDERSTAND OR LIKE, PLEASE CIRCLE IT, AND WRITE ME A NOTE IN THE BOOKLET. I NEED TO KNOW WHAT YOU THINK ABOUT HOW GOOD OF A TEACHING TOOL THE PACKET IS. FEEL FREE TO BE CRITICAL !

WRITE YOUR START TIME: _____ END TIME: _____

Fill in these questions after you are done with the booklet.

Circle a number for each question.

How was the pretest in difficulty? Easy 1 2 3 4 5 Hard

How good were you at using
longitude and latitude before using Poor 1 2 3 4 5 Good
this learning packet?

Did the first pages about the
value of longitude and latitude
seem to motivate you? No 1 2 3 4 5 Yes

Did the pages of instruction on
how to find longitude and
latitude clearly explain the
necessary steps? No 1 2 3 4 5 Yes

Were there enough examples? No 1 2 3 4 5 Yes

Where there enough problems
for you to practice? (Not enough) 1 2 3 4 5 (Too many)

Did the post test really test what
you learned? Yes 1 2 3 4 5 Yes

Were you nervous or confident
as you sat down to work on this
booklet? Nervous 1 2 3 4 5 Very Confident

Do you feel good about longitude
and latitude now? Can you use it? Not sure 1 2 3 4 5 Yes!

Did the post test seem like a
realistic test for someone your (Yes / No) Why: _____
age and someone learning this

material?

Overall Rating (Good/Poor)

Poor 1 2 3 4 5 Good