Designing learner-centric e-learning in STEM disciplines Prof. Sahana Murthy Interdisciplinary Programme in Educational Technology Indian Institute of Technology, Bombay

Lecture - 17 Feedback

We have seen the need for incorporating active video watching, contextualized learning activities and learning by doing activities in an e-learning context. We have discussed that these are necessary for enhancing learning engagement to deepen their understanding for learners to get a grip on the topic and to be able to apply it. At this point we have to ask when we are designing using a learner centric approach is it sufficient to design these activities hoping that learning happens when our students do these activities. Intuitively both as learners as well as teachers we know that its not enough to simply do something.

The learner needs to get some sort of feedback on his or her performance on where they are now; what is expected how much is required to get there. In this learning dialogue, we will look at the house of giving feedback when we design e-learning.

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Let's briefly pause at a reflection spot before going ahead. Suppose you are in a team and you are designing learning activities in some for some e-learning context and one of your team members creates learning by doing activity as a multiple choice question and gives feedback which says correct or wrong you know those green checks or the red crosses. Do you think this is effective? Vote yes or no and when you are done please resume.

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Some of you may have thought that this feedback is useful and you are right in the sense that a learner needs to know whether his or her performance was indeed correct or not. Others may have thought that this feedback is not effective and you are also right because we know that simply saying yes or no or correct or not is frequently not sufficient, it is not effective because we do not know why we went wrong if we were wrong we do not know what to do instead.

Discussion of Refle	ction Spot		
	Learners do need to g their response was cor However feedback th whether an answer is sufficient. Effective feedback requ - Each learner to u response was wrou - What to do to get correctly, next step	et feedback on whe rect or not. hat merely points correct or wrong is uires– inderstand why his ng improve: how to re ps to take	ether out s not /her eason
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What is missing with the correct or wrong type of feedback alone is that every learner needs to understand why her or his performance or response was wrong and what they should do to improve that is how to reason from where they are towards the correct option, the correct answer, the correct reasoning.

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The underline pedagogical design principle here is that a formative assessment that is we design learning activities that is specifically intended to generate feedback on performance to improve enhance and accelerate-learning. That is the feedback aid students to become self regulated learners that is it helps them understand, where they need to be, where they are now with respect to it and how to get there.

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The nature of such feedback does needs to be constructive that is it should help the learner change or revise their understanding if needed and it should point them to the in the direction of productive change. Such feedback also needs to be customized, that is each learner may have a different reasoning they may have a different reason why they chose a particular response. So, the feedback should help different learners go from where they are towards where they need to be.

Customized feedback helps each learner understand where the problem is and how to fix it. A needless to say effective feedback also needs to support positive motivation and self esteem that is the feedback should not put down a learner even if the response is wrong and this is again something we are very familiar with from our experience as teachers or learners.



Why is constructive and customized feedback important? What research on learning and formative assessment tells us is that for feedback to be useful for learning the student must know three things the ones we have talked about so far; what good performance is that is they should possess a concept of the goal or the standard to be met. Secondly, the student should be able to compare current performance with the expected performance and finally, the student should know how to get from where they are to where they should be that is they should be able to close the gap.

Now, let us come to the question of how do we design such feedback in an e-learning context where most things are automated and the learners are not always in front of us. So, we will look at two different types of learning activities; let us begin with short answer or specifically with multiple choice questions which may have a few options three or four or five. How do we design customized constructive feedback?



The first guideline is that we should go beyond saying correct or wrong and then we should be able to apply these principles of effective feedback to the various options and most platforms are able to handle this level of differentiation that is we need to be able to design slightly different feedback for each option that the learner chose.

So, if a learner chooses option a in a specific multiple choice question. The feedback that she gets should say not only that option a is wrong, but why it is wrong and what she may be able to do to get to the right answer. Similarly, if another student chose option c which also may be the wrong answer he would get feedback saying why option c is wrong and that may not be the same reason as the earlier as option a and he should get feedback which says which helps him go from the reasoning for option c to towards the correct answer again this path or these resources may be different.

So, its fine to tell one learner go look at the previous video and its fine to give feedback for a different option on you know correcting something else.



So, far we saw how we can incorporate customized constructive feedback in multiple choice questions, but as instructors we often want our students to do learning activities or answer questions which require much longer answers. It could be problem solving, it could be writing reasoning, it could be drawing graphs, drawing diagrams. And in face to face classes we even have much more complex tasks like projects which may or may not be part of e-learning, but essentially there are many activities which cannot be automatically graded using a single correct or wrong answer. What do we do in such a case in the e-learning context?

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One recommended solution here is to use descriptive performance rubrics implemented via peer review or self assessment.

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Rubrics		(
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Performance level Criteria	Target	Acceptable	Poor	
/				
Criterion-1 Criterion-2				

Rubrics are descriptive rating schemes that define performance at various levels that is what actually constitutes the target performance, what constitutes some performance in between which is not the target, but kind of not bad and what constitutes poor performance.

Rubrics are not numerical in nature they are descriptive, they actually help the learner and the reader figure out using the words the descriptions where they are at that point. And rubrics are effective for complex tasks such as longer problems which have various aspects of criteria that need to be used to give feedback.

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The takeaways for us as we design using a learner centric approach are that we need to close thelearning loop. Once we have designed activities several activities we need to make sure that learners get feedback on each task on each activity and this feedback should be useful, it should be constructive customized. It is possible to give constructive and customized feedback in elearning either using automatically graded tools such as differentiated feedback in multiple choice questions or using descriptive performance rubrics.

Thank you.