Evaluation Instrument:

Report Feature of the Website Reflex Math

Sameera Dana

Concordia University

Executive summary

The aim of this report is to analyze the application of an evaluation instrument to the educator's reporting feature of the educational website Reflex Math. The evaluation instrument performs an analysis of three areas; technical, data, and pedagogy to get a global score which returns either a positive review or a negative review of the educational website. After the application of the evaluation instrument to the educational website it returned a relatively positive review, indicating that the educator's reporting component of the website is a valuable resource in schools today and as a part of assessing students. A few recommendations are to allow the educator to provide digital feedback to students, to modify filter options on the reports, and finally to allow educators more flexibility in selecting which individual mathematical operations to assign each student.

Evaluation Instrument:

Report Feature of the Website Reflex Math

As the amount of available online resources become more numerous it is important for educators to assess their quality and educational value in their curriculum. Reflex Math is an educational website aimed at elementary students to gain fluency in their math facts (ExploreLearning, 2018). The evaluation instrument's aim is to assess the reporting component the educator has access to through the website. Through a presentation of the educational website, explanation of the design and use of the instrument, and finally the application of the instrument to the website we gain an opportunity to critically analyze it's value for educators.

Educational Website

Reflex Math's aim is on improving math fact fluency for elementary students and adapting to students varying abilities ("Math Fact Fluency—Problem Solved! | Reflex," 2018), as well as shifting the fluency "from acquisitions to automaticity" (Cholmsky, 2011, p. 8). The website uses engaging and entertaining games to motivate students to practice their basic math facts in addition, subtraction, multiplication and division. ("Math Fact Fluency—Problem Solved! | Reflex," 2018). Educators are able to access reports based on students' usage and to assess if students are progressing in their math fact acquisitions (Cholmsky, 2011). Math facts are adapted to students' current abilities, and as they progress in acquiring their math facts, games also become more complex. (Cholmsky, 2011). Based on the website's research they claim that "... students' well-honed ability to automatically retrieve math facts will enable them to be successful while their working memory is devoted to the new procedure they are mastering." (Cholmsky, 2011, p. 16), and that once students can acquire these basic math facts they can solve more intricate mathematical problems (Cholmsky, 2011). The website is

developed by Explore Learning, a company who provides online educational websites about math and science ("About ExploreLearning," 2019). To gain access to the website, educational institutions must pay a yearly license fee. There is also a version for home educators and parents, as well as a free thirty-day trial for those that would like to try it before purchasing it ("Math Fact Fluency—Problem Solved! | Reflex," 2018). The component that I am evaluating focuses on the reports which the educator has access to from the website. The reports provide a way for educators to assess students' usage, their math fact fluency acquisition and presents data in various forms (ExploreLearning, 2018).

Evaluation Instrument

The evaluation instrument's design focuses on evaluating the reports which the educator has access to through the Reflex Math website. In order to create an instrument that was cohesive and targeted towards assessing the educator's reports, I started with an objective as "... a good evaluation design begins with the end in mind."(Burns, 2018, para.8). The "objectives-oriented evaluation" (Attwell, 2006, p. 21) approach was used for this instrument to be able to evaluate if educators can effectively and efficiently (Davidson Ann-Louise, personal communication, September 18, 2019) assess a student's progress (or lack of progress) in their math fact fluency.

With this objective in mind, three areas of evaluation were designed; technical, data, and pedagogy (see Appendix for evaluation instrument). These three areas were specifically selected as they cover the essence of the objective, namely the efficiency and effectiveness (Davidson, 2019) of the educator's reports. Within these three evaluative areas, additional sections of assessment were built (see figure 1). For each of these sections, a set of three subsections provide specific statements assessing the reporting component of the website. As El Mhouti, Nasseh and Erradi suggest (2013) the structure of the instrument follows a downward flow, where one

criteria is not more valued than another but is seen as a comprehensive part of the final

evaluation. Within the subsections, the statements ask the user of the instrument on a scale of one

to four, with one being that they strongly disagree and four being that they strongly agree, to rate

the given statement. Each statement is given a score, from one to four, and then each subsection

is given its own score.

Each subsection is added to give a section score, which is then summed to give a global

score for the evaluation of the website. Within each subsection, a score of at least nine must be

obtained to be counted in the section score, indicating that the subsection returned a mostly

positive review of that specific subsection. A global score of eighty-one or more indicates that

the evaluation instrument has returned a positive review of the educational website. Where a

global score of eighty or less suggest a negative review of the educational resources. The global

score is a comprehensive measurement which the evaluator can use to assess the quality of the

educational resource, and to what degree the objective of the evaluation instrument has been
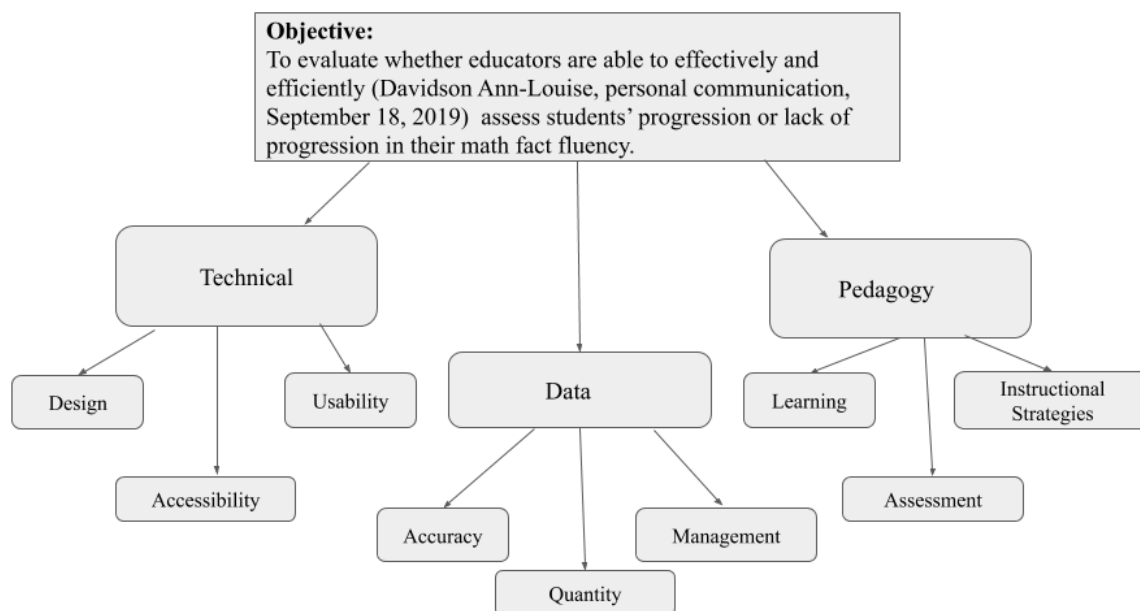
obtained.

Objective:
To evaluate whether educators are able to effectively and efficiently (Davidson Ann-Louise, personal communication, September 18, 2019) assess students' progression or lack of progression in their math fact fluency.

Technical

Pedagogy

Design

Usability

Data

Learning

Instructional Strategies

Accessibility

Accuracy

Management

Assessment

Quantity

Figure 1. Evaluation instrument structure.

Evaluation and Criticism

In applying the evaluation instrument to the educator's reporting component of Reflex Math, it returned a mostly favourable score of ninety-two. In the technical section, the design was very well marked and it reflects a well thought out plan with regards to the interface design. After the educator logs in, they are brought to a dashboard that has a white background with a deep blue interface at the top and various reporting options to choose from. The initial dashboard displays all the classes the educator is managing through the website. Once a group report or a class report is selected the colour at the top of the screen switches to a vibrant green. The reports are presented in a clear and concise manner using various graphs (such as pie charts and bar charts), and are overall aesthetically pleasing as the website is clear and not overwhelming with too many graphics and colours. Overall, the accessibility score is high according to the evaluation instrument as there are multiple ways to access reports such as on tablets or mobile

devices. A unique login with a password is needed to access the reports, which is created by the educator during the initial set up. The usability of the reports returned a strong score as well. Although at first, it can be overwhelming to navigate all the different types of reports they are fairly simple to read and analyze by the educator. Online support is well thought out, with a selection available at the top right corner of the user interface giving the educator options depending on what type of assistance is needed.

The second area the instrument evaluated was the data of the educator's reporting component of the Reflex Math website. The accuracy section scored well as the website provides recent data (in the last fourteen days), as well as allows the option to view data over another defined period of time. The quantity of data supplied is more than enough for analysis by the educator as the quality is good. The educator is provided with data information such as specific math fact fluency gains of each student, usage frequency, and if they are attaining milestones among other analytics. The educator is also emailed a notification of data for the past fourteen days of each class they are managing. The data is fairly easy to manage as many options are given to view the reports and to transfer to other sources such as a pdf or datasheet. The data can also be managed by applying various filters, although some seem out of date and ethically questionable, such as the filter option by ethnicity. The ethnic identity of a student does not seem to be a relevant factor for an educator to assess a student's math fact fluency.

The third section of the instrument evaluates the pedagogy in regards to the educator's reporting component of the Reflex Math website. When looking at a student's dashboard profile on the website, the reports provide a well-organized summary of the student's learning and also supports varying learning styles or preferences by catering to students with varying abilities, and gains in their math facts. In evaluating the educators learning objectives, this is a little less clear

as it would depend on the particular objective of the educator when using the website with students. The subsection of assessment was one area where the evaluation instrument did not return such a high result, particularly in the area of providing feedback to students. The educator has no direct method of digitally communicating feedback to students on their progress, through the website. There are resources to recognize student achievement through printed certificates and classroom-based recognition programs (ExploreLearning, 2018). It would be a supportive feature if the teacher could provide some form of online feedback based on the reports to students. These could include an encouraging message, or guiding them in using certain math strategies for those students who are struggling to gain specific math fact fluency. The reports do however provide a favorable score on supporting in-class assessments and helping the educator analyze if the student is in fact acquiring their math facts. The educator's report supports the instructional strategy of "differentiating instruction" (Cholmsky, 2011, p. 18), and provides sufficient individual and grouped based feedback where the educator could adjust their in-class instruction. For example in a case where numerous students are experiencing similar difficulties acquiring certain math facts, this could be touched upon further during classroom instruction. Through the reporting interface, the educator does have the option to adjust the math facts from addition and subtraction to multiplication and division. It would be a good feature to be able to individually select single or multiple mathematical operations, or a combination of any two, and not necessarily be only given a choice of two combination options.

Conclusion

Through the presentation of the website, an explanation of the evaluation instrument, and the application of the instrument we are able to conclude that the efficiency and effectiveness (Davidson, 2019) of the reports available through the Reflex Math website are clearly present.

Although the instrument did return a positive score, there are a few points needing consideration. One suggested addition is for the educator to be able to provide direct feedback to the student through the website. Another suggestion includes removing ethnicity in the filter option of the reports, as the relevancy of a student's ethnicity doesn't seem to be tied to their math fact fluency gains. Finally, the possibility to select different combinations of mathematical operations instead of the two options currently available. Overall this resource provides a good extension of classroom learning, engages students in a fun and interactive manner, and provides additional assessment methods for the educator.

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Appendix
Evaluation Instrument

TECHNICAL
1-Design

1a) The colours used in the interface support reading students' reports.			1b) The reports are well organized.			1c) The graphics are aesthetically pleasing.		
Strongly disagree	1		Strongly disagree	1		Strongly disagree	1	
Disagree	2		Disagree	2		Disagree	2	
Agree	3	x	Agree	3	x	Agree	3	
Strongly agree	4		Strongly agree	4		Strongly agree	4	x
Score		3	Score		3	Score		4
Sub-section score	**10**							

2 - Accessibility

2a) It is easy to access students' reports.			2b) It is accessible on other devices such as a tablet or mobile phone.			2c) The level of security is sufficient.		
Strongly disagree	1		Strongly disagree	1		Strongly disagree	1	
Disagree	2		Disagree	2		Disagree	2	
Agree	3		Agree	3		Agree	3	x
Strongly agree	4	x	Strongly agree	4	x	Strongly agree	4	
Score		4	Score		4	Score		3
Sub-section score	**11**							

3 - Usability

3a) It easy to navigate the reports.			3b) It is fairly simple to learn to read the reports.			3c) There is sufficient online support for educators having difficulties.		
Strongly disagree	1		Strongly disagree	1		Strongly disagree	1	
Disagree	2		Disagree	2		Disagree	2	
Agree	3	x	Agree	3	x	Agree	3	
Strongly agree	4		Strongly agree	4		Strongly agree	4	x
Score		3	Score		3	Score		4
Sub-section score	**10**							

Technical section score	31

DATA
1- Accuracy

1a) The data provided is from recent student activity.			1b) The data aligns with similar results as classroom evaluations.			1c) The educator can verify the data over a certain period of time.		
Strongly disagree	1		Strongly disagree	1		Strongly disagree	1	
Disagree	2		Disagree	2		Disagree	2	
Agree	3		Agree	3	x	Agree	3	
Strongly agree	4	x	Strongly agree	4		Strongly agree	4	x
Score		4	Score		3	Score		4
Sub-section score	**11**							

2 -Quantity

2a) The resource provides enough quantity of data for analysis by the educator.			2b) The quantity of data has quality.			2c) The educator is regularly updated with new data.		
Strongly disagree	1		Strongly disagree	1		Strongly disagree	1	
Disagree	2		Disagree	2		Disagree	2	
Agree	3		Agree	3		Agree	3	x
Strongly agree	4	x	Strongly agree	4	x	Strongly agree	4	
Score		4	Score		4	Score		3
Sub-section score	**11**							

3 - Management

3a) It is easy to manage the data.			3b) The data is transferable to other sources.			3c) The data can be presented in various forms.		
Strongly disagree	1		Strongly disagree	1		Strongly disagree	1	
Disagree	2		Disagree	2		Disagree	2	
Agree	3	x	Agree	3		Agree	3	
Strongly agree	4		Strongly agree	4	x	Strongly agree	4	x
Score		3	Score		4	Score		4
Sub-section score	**11**							

Data section score	**33**

PEDAGOGY
1- Learning

1a) It reflects the educator's learning objectives.			1b) It supports a particular learning theory.			1c) The reports provide a summary of math facts that are being learned.		
Strongly disagree	1		Strongly disagree	1		Strongly disagree	1	
Disagree	2		Disagree	2		Disagree	2	
Agree	3	x	Agree	3	x	Agree	3	
Strongly agree	4		Strongly agree	4		Strongly agree	4	X
Score		3	Score		3	Score		4
Sub-section score	**10**							

2- Assessment

2a) The educator is able to provide feedback to students.			2b) It supports traditional in-class assessments (such as tests).			2c) The reports are sufficient to gauge if a student is acquiring their math facts.		
Strongly disagree	1		Strongly disagree	1		Strongly disagree	1	
Disagree	2	x	Disagree	2		Disagree	2	
Agree	3		Agree	3		Agree	3	x
Strongly agree	4		Strongly agree	4	x	Strongly agree	4	
Score		2	Score		4	Score		3
Sub-section score	**9**							

3 - Instructional strategies

3a) The reports support a certain instructional strategy.			3b) The reports give enough feedback to adjust in-class instruction.			3c) The educator can adapt the student's online math facts based on the reports.		
Strongly disagree	1		Strongly disagree	1		Strongly disagree	1	
Disagree	2		Disagree	2		Disagree	2	
Agree	3	x	Agree	3	x	Agree	3	x
Strongly agree	4		Strongly agree	4		Strongly agree	4	
Score		3	Score		3	Score		3
Sub-section score	**9**							

Pedagogy section score	**28**

Global score	**92**