Constructing a Rubrics of Peer Assessment Applied on Online Course in 2D Animation Production

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Abstract
The continues controversy about the fairness on peer assessment. However, in MOOCs (Massive Open Online Courses) environment, a huge amount of assignment had to use in peer assessment. According to the previous research, constructing a rubrics could help learners understand the evaluation criteria and improve the fairness issue. However, the literature of rubrics which was applied on MOOCs is rare, especially the issue on the curriculum of design types. Therefore, this research aims to construct a rubric, which is suitable for peer assessment in animation with online course. The purpose of evaluating the students' scoring performance after using this rubrics is to help learners to understand the assignment scoring standards and improve the fairness problem.
Data collection approaches mainly include questionnaires and interviews. Participants were learners of elective "2D Animation Production." The questionnaires and peer assessment scores were collected respectively utilizes SPSS statistical software to test the proposed hypotheses of this project, the method includes independent-sample T-Test and Spearman's rank correlation coefficient. The study found that the perception of this course using rubrics in peer assessment relevant is positive, and the statistic results of the five assignments show that the scores of experts are highly related to peer assessment. That displaying scores of experts and peer are tending to identical. The rubrics improves the fairness problem and allows learners to make a self-examination by each item of rubrics.

Keywords: peer assessment, rubrics, MOOCs, 2D Animation Production

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Introduction

With the rise of MOOCs, many lecture programs are now shared on the internet and expand learner from hundreds to millions then lead to global impact. Facing this amount of students, grading becomes a heavy load for teachers. Though many lectures now choose peer assessment for calculation (Koller，2012), fairness has ceased to be the biggest problem (Cheng & Warren, 1997). While there is no standard and fix answer for design works, reasons like uncertainty, subjectivity, and lack of professional knowledge will affect the fairness and quality of evaluation (Topping,1998). Peer assessment must face this problem and solve it.

Peer assessment is massively used on various fields and with outstanding effect but there are studies show setting up clear standard should improve the fairness in grading system (Wang & Yang, 2015). Many lectures now use "rubrics" for grading includes Language curriculum, Literature, Mathematics, Music, Performance Art, Visual Art, etc (Orsmond, Merry & Reiling, 2000; Wolf & Stevens, 2007). As rubrics mainly used in traditional classroom, study shows that it can also be used on online animation lecture.

Therefore, this research aim to establish a rubrics for online animation lecture then evaluate the grading result of students, below are the two questions for this research:
(1) The participants' satisfaction about rubrics of peer assessment.
(2) The relation between peer assessment using rubrics and teachers' grading.

Literature Review

Peer assessment

Peer assessment is a new grading system develop from multiple assessment and by the definition of Falchikov (1995), peer assessment is a process of group giving score to individuals. Participants will be able to raise thought and doubt to each other while their ability of self reflection is being trained. There are four advantages of peer assessment which includes, (1) improve student's reflection ability, (2)increase learning motivation, (3) encourage self learning and (4)train to accept criticism and four disadvantages, (1) high anxiety in learning process, (2) failure in fulfilling grading duty, (3) reluctant to grade in order to maintain harmony in peer and (4)lack of professional knowledge (Sluijsmans & Moerkerke, 1998; Lin & Liu, 2000; Topping, 1998; Bhalerao & Ward, 2001).

While peer assessment system exist before the popularity of internet, there has been a great deal of related research (Topping, 1998; Searby & Ewers, 1997; Brindley, Scoffield, 1998). In particular, Topping's (1998) literature review identified 109 peer assessment studies and found it is mainly used on Writing, Civil engineering, Electrical engineer, Information engineer, Mathematics, Society science, and so on which cover lot of different fields. Different from online's grading system, the process of traditional's is (1) teacher give out assignment, (2) student finish assignment, (3) turn in assignment, (4) first round of peer assessment, (5) adjust assignment and resubmit, (6) second round of peer assessment and (7) give out final score. As the stability of internet improves over decades, the combination of peer assessment and online learning help it to be multivariate (Rush, Sue et al., 2012; Vozniuk, Holzer & Gillet, 2014; Lai & Hwang, 2015), however, online peer assessment system has its time frame limitation and difficulty in controlling large scale of students. On the other hand, fairness is still an issue in many cases which rubrics

should solve (Kaufman & Schunn, 2011). Under the discussion of MOOCs as learning platform for 2D animation lecture of Wang & Yang (2015), the research result show student' doubt toward the fairness of the system. One of the improvement actions is to use rubrics as grading standard. This method can significantly reduce unfair situation (Kaufman & Schunn, 2011; Reddy & Andrade, 2010). We can see the importance of a clear standard for peer assessment system.

Rubrics

Rubrics is a standard system for grading which not only has qualitative description list but quantization score to evaluate certain performance and assignment. The benefit of rubrics is the detailed description of every scoring rule that do not vary due to change of standard or subjectivity from different person or time. By understanding grading system, students can evaluate his/her performance by themselves. It is obvious that it is not easy to design a rubrics. First of all, one needs to understand the lecture requirement in order to establish clear standard. There are eight steps to construct the rubric (Hsu, 2009), including (1) take reference from other rubrics example then choose a suitable model from analytic rubrics or holistic rubrics, (2)set up clear definition for grading system, (3) detail description and subtitle, (4) establish three or four degree of grading level like need improvement, room to grow, excellent work, (5) define the scores for each level, (6) make sure the description is easy to understand, (7) constant check and discuss with peer and (8) communicate with students during class and make sure they understand this grading system. And this research focus on online lecture therefore is unable to discuss with student in class thus use only the first seven steps to establish the rubrics.

After construct a complete, however, whether it can improve the fairness issue when apply in class or not, is still debatable. Let us see below for details.

Sadler & Good (2006); Reddy & Andrade (2010) apply rubrics in lecture and it shows a positive impact on student's learning attitude and professional skill while reducing fairness issue. Research from Andrade & Du (2005) also shows rubrics can help students to understand the focus of lecture, to divide project in parts and evaluate his/her work then leads to better learning and academic performance. While study from Alias & Salleh (2015) show rubrics and grading system fail to consistency the score between students' and teachers'. In conclusion, though using rubrics can set up clear standard, it can not guarantee the consistent result. Learning is a necessary step before using rubrics thus this research will focus on rubrics applying on online lecture and how students can learn to evaluate and grade assignment after times of grading.

In MOOCs environment, due to the large number of students, teachers are unable to finish assignment grading individually. Though many platforms have automatic grading system but as the focus of this research is art lecture, the result can not be standardized thus unfit for automatic grading system. The fairness issue has always exists in peer assessment system, but above of the literature shows the rubrics can make improvement. On the other hand, rubrics mainly apply on traditional classroom and there is little study on its application on online lecture. Based on the above descriptions, this research will target at online animation lecture with peer assessment using rubrics then observe participants' perception in online lecture environment and collect their performance by questionnaires.

Methodology

This research observes *2D Animation Production-2015 Fall Courses* on *ShareCourse* (http://www.sharecourse.net) learning platform which take ten weeks and used rubrics designed by this research as peer assessment tool. The data collect method based mainly on grading result, questionnaires and interview then analysis on the data.

The research subject has to fulfill two conditions, (1) sign up for *2D Animation Production-2015 Fall Courses* and (2) finish courses and participants of the peer assessment. The questionnaire will release after ten weeks courses and put on online platform *Wenjuan* (https://www.wenjuan.com). The data were collected from Nov. 18th 2015 to Nov. 30th 2015, total twelve days for volunteers. Nineteen questionnaires turned in at the end including seventeen female and two male participants with average age of twenty-two. In addition, we have invited three experts with more than ten years professional experience to grade the assignments as comparison data to peer assessment result. Table 1 is the brief description on three experts.

Table 1 Brief Description on Three Experts

	Experience in Industrial	Experience in Academic
Expert A	23 years	11 years
Expert B	32 years	5 years
Expert C	32 years	2 years

Experiment Design

2D Animation Production-2015 Fall Courses will turn in assignments practice on week 3, week 5 and week 7 and final project assignment on week 8 and 10. Each student is required to upload it to learning platform and use rubrics to do peer assessment within a week. Total scores will be 100. Four assignments grading is needed on each peer assessment for each student. First student interview place after week 7 on assignment practice to understand the difficulty in process. We thought regarding actual usage then adjust before week 8 and 10's assignment grading. Second interview done after the 5th peer assessment in order to understand participants' perception, problems encountered when using rubrics and their opinion. All the content will be used to improve rubrics application on 2D animation on online courses.

Questionnaires

Peer assessment questionnaires take reference from scholar Liu, S. Y. (2003) and Wang & Yang (2015) which has a considerable validity and reliability then modified to questionnaire on "*Questionnaire of participants' opinions on Online Peer assessment*" for this research. It contains three parts, below is detailed description:
 (1) Acceptance: understand participants' preference and acceptance toward online peer assessment system, eight questions in total.
 (2) Fairness: understand whether students can be genuine and fair during grading process, ten questions in total.
 (3) Learning Performance: understand participants' learning experience and performance by self evaluation based on peer assessment system, six questions in total.

This questionnaire is the seven point Likert scale.

Interview

After three peer assessment on assignment practices will perform the first interview on three random students. The interview is based on two questions aim to understand student's usage on rubrics and take ten minutes in total. After 10th week's courses, second interview will choose five students randomly and ask five questions which take ten to fifteen minutes in order to understand the actual experience and motivation in using rubrics. Consent will be acquired before interview to voice record as research data.

Rubrics

This research will set up three rubrics for different type of assignment using Microsoft® Excel. Grading a animation assignment for this course has to based on below four aspects, proposal design, action design, visual art and character design (Chen, 2011). Each assignment choose suitable aspects for three different rubrics on practice assignment, proposal assignment and animation project.

The content is to do basic practice assignment on provided script thus the first version of rubrics choose action design, visual art and character design as grading aspects. This version does not have level differences of each item, the score is fixed. Each standard item has a checking point, the score will be generated based on clicked items on Microsoft® Excel. While students might not have the professional knowledge for grading, we set up clear items for them to click on which lead to automatic generation of score. Make the grading become very easy. On the interview after three assignment practices, student feedback on the inflexibility and tendency to miss click on items causing failure in score calculation. So adjustment is made based on above feedbacks.

The second version perform on two project assignments including proposal assignment and animation project two rubrics (see Fig. 1). Second version change the single column into five scale so the student can choose from 0 to 4. On the other hand, checking area is added to prevent any mis-clicking issue which will first appear X sign and turn O sign if every column is check correctly. X sign will appear in two cases, one is mis-click, the other is double click on same item. The rubrics is ready is checking area all show O sign. This version is not only more detailed but user-friendly. Both of them has automatic counting system to prevent potential error in calculation. Items chose for proposal assignment and animation project are proposal design, action design, visual art, character design. The proposal assignment and animation project require students to execute all the knowledge from course and reflect the idea, concept and elements of making thus need four items to grade a animation assignment thoroughly.

Standard	Iten	Excellent (4)	Nice (3)	Ordinary (2)	bad (1)	Very bad (0)	score		checking area
Idea and Story (16%)	The story is creative	V					4	4	O
	The story is interesting		V	V			0		X
	The content of the story has been carefully designed						0		X
	The story is complete						0		X
Action design (32%)	Action is very smooth						0	0	X
	lens design is fluency						0		X
	"In Between" used correctly						0		X
	Timing is master the correct						0		X
	Action design have strengthened the performance						0		X
	Character's action perform is interesting						0		X
	role expressions rich						0		X
	Front and rear lens of action is coherent						0		X
Scenes (30%)	Scenes design rich						0	0	X
	Has increased the picture level design						0		X
	The scenes has been design						0		X
	The location of each object is appropriate, the picture is not messy						0		X
	Performance style is unique, with individual characteristics						0		X
	Color use appropriate						0		X
	Line drawing fluency						0		X
	The texture of each object is delicate						0		X

Standard	Iten	Excellent (2)	Nice (1.5)	Ordinary (1)	bad (0.5)	Very bad (0)	score		checking area
character design (14%)	Character Stature proportion correct						0	0	X
	Character facial features proportion correct						0		X
	Character modeling is interesting						0		X
	Character design style is unique						0		X
	Character model is simple						0		X
	Characters has a clear character						0		X
	Meet the needs of the subject						0		X

Standard	Iten	Excellent (4)	Nice (3)	Ordinary (2)	bad (1)	Very bad (0)	score		checking area
music (4%)	Have background music and sound effects						0	0	X
Completeness (4%)	Please give a score according to the overall integrity of the assignment.						0	0	X
						Total Score		**4**	

Figure 1: Rubrics for Project Assignment.

Results

The data collection of this research is based on questionnaire and interview then analyze by SPSS18 software tool, independent sample *t-test* and *Spearman's rank correlation* coefficient. The results of the study are presented as follows.

Result of Questionnaire

First of all, we intend to know whether student can understand the rubrics and follow its rule provided by online courses. *The rubrics for this course's peer assessment is easy to understand and follow* (average 5.36); full scores is 7, 74% students agree on the fact that the rubrics is user friendly. At the same time, we need to know if four assignments at a time is appropriate; *I think four assignments for peer assessment on this course is appropriate* (average 5.26). The result show 79% students think four

assignments is appropriate. After interview, students state that using rubrics help them understand the standard on peer assessment and how their score come from. Other students express their difficulty in grading five assignments which is very time consuming and advice decrease the number down to three or four. After researcher change the number into four, it become acceptable for students.

Regarding fairness issue, we would like to understand the attitude hold by students when they are giving out score. *I was careful and concentrate when grading others assignment* (average 5.47), 68% students think they are dedicated in grading process. But from another perspective, though 63% students think they pay full attention to assignment grading, there are almost 20% students think their own assignment is graded by careless grader. *I think other classmates give grade my assignment carefully* (average 4.78). After the interview, students thinks using rubrics can help them grade accurately and rubrics for project assignment is more fair than assignment practice. Grade by different level is more flexible than click on checking columns. There are students think as detailed as the rubrics is, he/she can not fully understand each items which cause uncertainty in grading process. Online instructional video is advised to help explain the content, advantage and disadvantage on example assignment thus students can have clear idea toward grading process.

Regarding self evaluation on learning effect, we want to find out whether student can have deep understand on lecture by peer assessment. *Through online grading system, I have better understanding of courses focus* (average 5.31). The result show 74% students agree. After peer assessment, will students learn their own advantage and disadvantage? *As I finish peer assessment, I have better understanding on my assignment's advantage and disadvantages* (average 5.31), 79% students agree. Furthermore, we want to know whether students will have extra related knowledge aside from lecture. *I have extra related knowledge by joining online peer assessment* (average 5.31) it show 74% agree on this. From the result of interview, we understand most students' motivation of joining peer assessment is to view others work and see if they are falling behind or ahead as well as the advantages and disadvantages of others. Other than that, students can understand the focus of making an animation from grading standard to better themselves. There are students, however, hope to get advice from different respective. While teacher's professional ability is not the same as the participant, it will be better to have advice from teachers.

Comparison between the scores from experts and peer assessment

We want to know if there are any differences between two teams thus we use independent sample *t-test* for analysis. Table 2 is the *t-test* result from five assignments' peer assessment and expert grading.

Table 2 Brief Description of t-Test on Five Assignments' Peer Assessment and Expert Grading

	Assessment mode	N	M	SD	t	p
Practice Assignment 1	Peer Assessment	19	54.6842	21.34649	-2.066	.046*
	Expert Grading	19	66.1579	11.41764		
Practice Assignment 2	Peer Assessment	19	55.2105	21.83671	-1.980	.055
	Expert Grading	19	66.3684	11.25073		
Practice Assignment3	Peer Assessment	19	65.3158	19.27881	-.360	.721
	Expert Grading	19	67.2632	13.58039		
Proposal Assignment	Peer Assessment	19	77.3158	11.15573	.974	.337
	Expert Grading	19	73.6316	12.14821		
Animation Project	Peer Assessment	19	74.2105	9.07732	1.056	.298
	Expert Grading	19	71.1579	8.74492		

*. $p<0.05$

Learning from Table 2, the first assignment reach significantly high($p<.05$) which means great difference between average grade given by experts and students. From average scores and standard deviation, there is also great difference between the first and second assignment. Coming to the fourth assignment (proposal assignment), average scores and standard deviation of grading from peer and experts start to be close. Take a further step to evaluate the consistency from the two by Table 3 Spearman's rank correlation coefficient of five times grading result of peer assessment and expert's grading:

Table 3 Brief Description of Spearman on Participants' Peer Assessment and Expert Grading

	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5
Peer Assessment1	.792**				
Peer Assessment2	.672**	.724**			
Peer Assessment3	.688**	.553*	.795**		
Peer Assessment4	.823**	.528*	.824**	.988**	
Peer Assessment5	.234	.215	.024	.162	.777**

**. $p<0.01$

We can see from Table 3, all five assignments reach high level($p<.05$) while the forth assignment reaches ($\rho=.988**$) which show the highest consistency and the other three as well. Though the first and second has high consistency, it start to rise at the third assignment. Starting to use the second rubrics from the forth assignment(project assignment one), it rise even higher.

Discussion

The result we can understand there is positive reaction toward applying rubrics on online animation peer assessment system which corresponds to Reddy & Andrade(2010). Students not only establish clear concept of grading but deeper understand toward course and assignment by using rubrics. However, the amount of assignments needed to grade requires extra precaution. Though using rubrics improve

the fairness issue, it add up loading too which lead to carelessness and impatient at grading then the fairness issue become even worse. This research start with five assignment to grade, the first two was normal and begin from the third, student start to complain. As the assignments needed grading change to four on the fourth assignment, the acceptance rise again. Thus, this research believe four assignments seems to be reasonable for online animation courses.

On the other hand, statistic show the first assignment reach significantly high($p<.05$) which means great difference between average grade given by experts and students while the other four are insignificant. The result of Spearman's rank correlation coefficient, five assignments all reach average and has high correlation. Started from the third assignment, the correlation begin to rise. And from average and standard deviation, the differences decrease and get closer to expert grading which also show peer assessment is consistent with expert's. There is a descend of correlation on fifth assignment, however, due to the project assignment requires professional knowledge. Though using, rubrics, it still needs more training with grading and experience to reach better effect. In fact, below three prospects affect the accuracy as well, (1) knowledge and experience of students, (2) the difficulty of assignment and (3) training on grading.

Based on above analysis, having rubrics is not enough. Though clear and detailed standard can provide reference for student in grading process but incomplete understanding of grading item could mislead them to failure and incorrect grading. Thus explanation online instructional video is advised to provide detailed description on each grading item's meaning in order to reach a accurate grading.

Conclusion

Participants use rubrics in peer assessment system with this course and this research rubrics is suitable for online animation courses, below are three contributions of this research:
(1) Make the peer assessment system to be easier and more accurate to use. The rubrics not only assist participants deepen the understanding of assignment and course, it also take away loading from teachers.
(2) Through rubrics and weeks of grading training, the score of peer assessment start to have high correlation with expert's which suggest a good rubrics can help to improve fairness issue.
(3) Rubrics of this research is fit for art design course and provide to future courses' usage and reference. User is free to alter the grading item and content based on the course.
   The result of the research show, the amount of grading assignments will affect fairness with the using of rubrics in peer assessment system. This research believe the acceptable amount should be four assignments. Moreover, prepare rubrics beforehand can help students to better understand rubrics and grade more accurately.

References

Alias, M., Masek, A., & Salleh, H. H. M. (2015). Self, Peer and Teacher Assessments in Problem Based Learning: Are They in Agreements?. *Procedia-Social and Behavioral Sciences*, *204*, 309-317.

Andrade, H. L., & Du, Y. (2005). Student perspectives on rubric-referenced assessment.A peer-reviewed electronic journal.Volume 10 Number 3, April 2005.

Bhalerao, A., Ward, A. (2001). Towards electronically assisted peer assessment: a case study. Association for Learning Technology Journal, 9(1), 26-37.

Brindley, C., & Scoffield, S. (1998). Peer assessment in undergraduate programmes. *Teaching in higher education*, *3*(1), 79-90.

Chen, S. C. (2011). Animation Box: Traditional animation production process. Retrived from http://anibox-toon.blogspot.tw/2011/06/2d.html.

Cheng, W., & Warren, M. (1997). Having second thoughts: student perceptions before and after a peer assessment exercise. *Studies in Higher Education,22*(2), 233-239.

Chiu-Lin Lai, Gwo-Jen Hwang.(2015). An interactive peer-assessment criteria development approach to improving students' art design performance using handheld devices. Computers & Education, Volume 85, Pages 149-159.

Falchikov, N. (1995). Peer feedback marking: developing peer assessment. *Programmed Learning*, *32*(2), 175-187.

Hsu, S. Y. (2009). Rubrics:The Helper of Teacher Assess of Students Assignment. Retrieved from http://ctld.nccu.edu.tw/ctld/?p=1496.

Kaufman, J. H., & Schunn, C. D. (2011). Students' perceptions about peer assessment for writing: their origin and impact on revision work. *Instructional Science*, *39*(3), 387-406.

Koller, D. (2012). What we're learning from online education. *TED Talk, online verfügbar unter http://www. youtube. com/watch*.

Lin, S. S. J., & Liu, E. Z. F. (2000). The Learning Effects of Web-based Peer Assessment for Various Thinking Styles Students. In *annual meeting of the American Education Research Association, New Orleans, Louisiana* (Vol. 404).

Liu, S. Y. (2003). Learning Mathematics with Computer Technology：Using Networked Peer Assessment in Junior High School. Departments of Electrophysics, National Chiao Tung University, in Chinese.

Orsmond, P., Merry, S. & Reiling, K. (2000). The use of student derived marking criteria in peer and self-assessment. Assessment & Evaluation in Higher Education,

25(1), 23-28.

Reddy, Y. M., & Andrade, H. (2010). A review of rubric use in higher education.Assessment & Evaluation in Higher Education, 35(4), 435-448.

Rush, S., Firth, T., Burke, L., & Marks-Maran, D. (2012). Implementation and evaluation of peer assessment of clinical skills for first year student nurses. Nurse education in practice, 12(4), 219-226.

Sadler, P. M., & Good, E. (2006). The impact of self-and peer-grading on student learning. *Educational assessment*, *11*(1), 1-31.

Searby, M., & Ewers, T. (1997). An evaluation of the use of peer assessment in higher education: A case study in the School of Music, Kingston University.*Assessment & Evaluation in Higher Education*, *22*(4), 371-383.

Sluijsmans, D., Dochy, F., & Moerkerke, G. (1998). Creating a learning environment by using self-, peer-and co-assessment. *Learning environments research*, *1*(3), 293-319.

Topping, K. (1998). Peer assessment between students in colleges and universities. *Review of educational Research*, *68*(3), 249-276.

Vozniuk. A. , Holzer. A. C. & Gillet. D .(2014).The 4th International Conference on Learning Analytics and Knowledge LAK14, Indianapolis, Indiana, USA, March 24-28 2014.

Wang, S. Y., & Yang, H. H. (2015). A Study of Peer Assessment Mechanism on Online Course in 2D Animation Production. The Eleventh Taiwan E-learning Forum(TWELF), in Chinese.

Wolf, K., & Stevens, E. (2007). The role of rubrics in advancing and assessing student learning. The Journal of Effective Teaching, 7(1), 3-14.

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