Current educational technology research trends in Japan

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Abstract   To examine trends in educational practice research, this article conducted a survey and analysis of factors affecting the review of research papers in the field of the educational technology in Japan. Two factors, namely, practical orientation and theoretical orientation, were extracted from 63 survey responses, and scores from members of a Japanese academic society were compared with the scores of its editorial board. Results show that the two factor scores were not correlated to each other, and they are independent measures for any evaluation or review of research articles. Also, there was no significant difference between society members and editorial board members, i.e., their preferences when reviewing research papers were identical. For the second part of this study, a group composed of anonymous members of an editorial board conducted a paper review of 12 published "practical papers" and 11 published "general papers." Results indicated that there was no significant difference between the two categories. The final rating scores of these 23 papers were analyzed using a decision-tree rating model. Results also indicated that for publication, papers need to contribute to theoretical research, in addition to contributing to basic educational practice research in educational technology.

Keywords   Practical research · Paper review · Practical emphasis · Theoretical emphasis · Educational technology

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Introduction

In Japan, the relationship between educational practice and educational research has been debated and discussed since the beginning of educational technology in the country (Sakamoto 1971). Then in 1992, Nagano did a summary report of methodologies in educational practice research and the aspects of basic and applied research within educational technology research. In 2002, Okamoto stressed the importance of research articles based on an established system of practical research for educational practice.

Educational practice research or practical research (defined in this article as research based on educational practice) is the preferred form of research in educational technology. Special issues dedicated to this topic have been published by Japanese academic journals (JSET 1995, 2002). Research methodologies for educational practice research have also been reported by Otani and Ikuta (2002). The importance of educational practice research is often discussed; however, its definition still needs clarification. Thus, it is a topic often addressed in symposiums and conferences sponsored by leading Japanese academic societies and, in particular, the Japan Society for Educational Technology (JSET).

Similar discussions on educational practice research have been conducted in the field of educational psychology. In 1998, Saeki et al. presented, from a psychological perspective, the various views and differences of opinion in the debate between educational research and practice. Likewise, Ichikawa (1999) and Akita and Ichikawa (2001) analyzed research articles that dealt with educational practice from an educational psychology point of view.

Ichikawa (1999), in particular, conducted an assessment of published journal articles dealing with educational practice, to define the role of practical research in the area of educational psychology in Japan. The assessment was based on a review of published articles and an analysis of the characteristics of reviewers who were also editorial members of an academic society's publication journal. Reviewer characteristics were evaluated using factor scores that were extracted from the survey through factor analysis.

According to the results of the Ichikawa study, the society has successfully promoted practical research and has published journal papers in the "practical papers" category since 1999. Other academic societies have also published "practical papers." The former CAI (Computer-Aided Instruction) Society (now called Japan Society of Information Systems in Education) has published this type of research papers in its official journal publication since 1992 (Vol. 9, No. 2), and the Japan Society of Science Education has published practical papers in its Science Education Research journal since 1995 (Vol. 19, No. 2).

Trends in research publications suggest that there are two categories of journal papers in educational technology in Japan: practice-based (or practical) papers and theory-based (or theoretical) papers. Again, the definition of a practical paper in the field of educational technology is not clear and the difference between these two categories has not been clearly defined. Nonetheless, the existence of two types of research papers is being acknowledged, and that these two categories are needed to meet two separate needs in terms of research in educational technology. It then follows that review criteria for journal papers have to be different and separate. But currently, almost all paper reviews are assessed using a single set of criteria, and these criteria are applied to two different types of papers that respond to the demands of two different types of research.

Obtaining a fixed set of criteria for research paper assessment or review is not easy, according to Fujigaki (2003), because acceptance criteria keep changing. Therefore, distinct characteristics or qualities of research papers in the field of educational technology need to be examined further to identify similarities and differences in trends between these two categories of papers. At the same time, it should be kept in mind, as Sakamoto (1971)

suggested, that educational technology is a field that involves a lot of practical applications and is different from educational science, but it is also a field that contributes heavily to educational practice in collaboration with educational science.

The overall goal of this article is to identify trends and issues related to research approaches in the field of educational technology in Japan. First, in terms of the review criteria used to accept or reject research papers for publication, this study aims to answer the following questions, using factor analysis:

1. When evaluating a research paper, how do members of a professional society rate the importance of a given set of review criteria?
2. Is there a difference in the importance given to review criteria for practice-oriented research papers as compared to review criteria for theory-oriented research papers?
3. Is there a difference in the ratings given by the members of a professional (educational technology) society as compared with those by the members of its editorial board?
4. Do the results of the factor analysis support the use of the review criteria to evaluate two hypothesized categories of research papers in educational technology: practice-oriented papers and general papers?

Using the results of the factor analysis in the first part of the study, the second part was conducted to analyze trends in the review of research papers and answer the following questions, using decision-tree analysis:

1. Is there a significant difference in the review scores of published research papers that were classified as practice-oriented papers and as general papers?
2. How do factors, namely, reviewer characteristics and paper orientation (practical or theoretical), affect the final ratings of papers reviewed for publication?
3. When reviewing research papers for publication, what trends or tendencies were identified using decision-tree analysis?

This article is considered a preliminary study because the survey that was carried out was conducted under limited conditions. Ideally, a study of this type would be officially conducted nationwide by an academic society, using an instrument such as the Ichikawa Survey (1999). Then, to extract the factors required for educational technology research papers, a questionnaire is usually sent to all members of an educational technology society in Japan, and papers published by Japanese journals would have been classified as practical research papers or theoretical research papers prior to their use in a study. However, in this paper, the survey was conducted based on voluntary responses by members of an academic society in Japan, and the scope of the survey items was more limited than the Ishikawa Survey. Further, published research papers that were used in this study were a combination of practical papers and general papers (papers that could be practical, theoretical and/or technical papers). The factor scores of these papers were compared to examine the differences in trends and contributions. In the first part of this study, factor scores were generated through a seven item survey that was given to two groups: members of an educational technology society and members of its editorial board. Each group was asked to indicate the importance of each item (survey items represent the criteria used for reviewing research papers for publication). Using factor analysis, the ratings given by the two groups were compared and analyzed. In the second part of this study, a set of published papers was selected and was given to a group of "reviewers" who applied the same set of review criteria that was used in the first part of the study. The ratings given by the "reviewers" were then analyzed for differences in trends and contribution. Trends in the review were identified using decision-tree analysis.

Review criteria for published research papers

Survey instrument

To extract the criteria or review factors that are used or preferred when editorial boards or review committees evaluate research papers, a seven item questionnaire was developed. The main question for this survey was "When evaluating the professional qualifications of a research paper in the area of educational technology, how much do you take into account or how important to you are the following review criteria? Please indicate your rating using a five-point scale: (1) not important at all, (2) somewhat unimportant, (3) neither, (4) somewhat important, (5) very important."

As the aim of this questionnaire is to survey trends in published research papers, two main review factors were identified:

– Practice-oriented factors: factors for research papers with topics which respond directly to societal demands (e.g., case study of educational practices)
– Theory-oriented factors: factors for research papers that are based on theoretical approaches or original ideas.

These two main factors were based on four major points that are commonly used in the review of research papers: novelty, validity, consciousness, and usefulness. Six questions were prepared, and one additional question item was also included for overall understandability of the research paper.

Survey method

To get responses from a broad range of participants, questionnaires for this study were distributed at the 20th annual meeting of the Japanese Society of Educational Technology (JSET) held during September 23–25, 2004. Out of 400 questionnaires distributed, 63 responses were received resulting in a response rate of 15.8%. This was considered to be a good response rate for a survey based on voluntary responses and was considered as sufficient in providing the study with reliable responses.

Survey results

Statistical mean scores for the seven questionnaire items are summarized in Table 1. Two question items in particular "(Q1) Paper addresses a topic of societal demand." and "(Q2) Paper's originality exceed that of previous studies." have mean scores which are higher than 4.0, so these items can be considered as major points in this questionnaire. In addition, all mean scores are above 3.0, suggesting that respondents do take into account all seven criteria items when reviewing research papers in educational technology.

To examine the factor structure for the question items, factor analysis was conducted and factors were extracted using methods for Principal factor, Varimax rotation, and Promax rotation. Using the hypothesized two factor model, the results of Varimax rotation determined the structure of each factor. Factor loadings are shown in Table 1 (Columns F1 and F2). The total contribution ratio is 47.0%. Although the ratio is not high, all items can be classified to fall under one of the two factors (practice-oriented and theory-oriented) determined earlier, and then loads were obtained.

The first factor, *practice-oriented*, consists of "societal demand," "usefulness," and "practice." The second factor, *theory-oriented*, consists of "theoretical," "advanced

Table 1 Question items and factor loading

Question item	Mean	F1	F2
1. Paper addresses a topic of societal demand	4.09	**0.70**	0.29
2. Paper's originality exceeds that of previous studies	4.43	−0.39	0.34
3. Paper has immediate usefulness or application	3.48	**0.76**	−0.12
4. Paper has strong theoretical contribution to research	3.86	−0.06	**0.67**
5. Research was based on an educational practice	3.91	**0.69**	−0.13
6. Paper utilizes highly advanced research technique(s)	3.33	0.08	**0.60**
7. Paper reflects high level writing skills	3.86	−0.16	**0.72**
Contribution ratio (Total ratio = 47.0%)		24.6%	22.4%

Factor loading values which were larger than 0.6 were shown in bold text

research technique," and "writing skills." It is interesting to note that "writing skills" (Q7) could be a common item for both factors, but for this study, it has been extracted for the second factor of "theory-oriented." The question item on "technique" (Q6) was intended to be a question about general research techniques. It is possible that respondents have interpreted it to be about one's technical engineering level. The two factorial structures are hereby defined according to the results of this factor analysis.

The terms "practice-oriented" as F1 (first factor) and "theory-oriented" as F2 (second factor) were used. According to the factor loadings, F1 values for "topics of societal demand" (Q1), "immediate usefulness" (Q3), and ''practice-based'' (Q5) were higher than 0.6. Their contributions are relatively high. However, loading values for "originality beyond previous research" (Q2) and "writing skills" (Q7) were negative, suggesting that the first factor emphasizes the practical value of education. The second factor, F2, consists of "theoretical contribution" (Q4), "advanced research techniques" (Q6), and "writing skills" (Q7). The factor loading values for "immediate usefulness" (Q3) and "practice-based" (Q5) were negative, and this suggests that the second factor emphasizes theoretical approaches and techniques.

These results indicate that these two factors (practice-oriented and theory-oriented) can be used for the review of published educational technology papers (which consist of practical papers and general papers) in the second part of this study.

Factor scores calculated from the responses of society members who responded to the survey are summarized in Fig. 1. The horizontal axis indicates F1 (first factor = practice-based) scores, and the vertical axis indicates F2 (second factor = theory-based) scores. There are some deviations for both scores, and F1 deviation is slightly larger than the F2 one. The correlation coefficient between the two factor scores is $r = -0.26$ ($p < 0.05$). This indicates that there is an orthogonal relationship, or a weak negative correlation, between the two factors.

The same survey questions were given to members of an editorial board of an educational technology society. Three out of four members responded, and the results are illustrated in Fig. 1. The editorial board members' F1 score is higher than their F2 score. To examine score differences between society members and the editorial board members, a t-test was conducted. There are no significant score differences between society members and editorial board members (For F1: $t(79) = 0.27$, $p = 0.79$; for F2: $t(79) = 0.86$, $p = 0.39$).

The results indicate that both society members and editorial board members evaluate research papers from the same points of view. However, there are some in-class deviations of survey respondents who are both society members and editorial board members, and the

Fig. 1 Scattergram of two factor scores of practice-oriented and theory-oriented papers
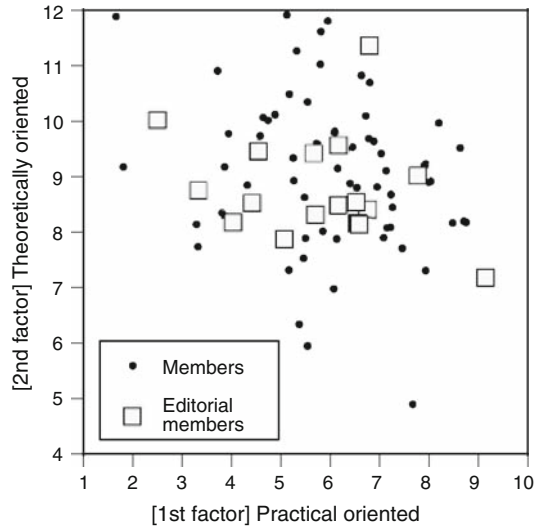
differences among these individuals are not small. Details of in-class deviations for board members will be discussed in the next sections.

Review of published research papers

In general, reviewers focus on the methodology and outcomes when evaluating research papers. Evaluation (review) scores for published journal papers in the area of educational psychology have been analyzed by Ichikawa (1999). He reports that evaluation scores are assigned or given by editorial board members who also formulate the review criteria for research papers submitted for publication in academic journals.

In the area of educational technology, each reviewer's research discipline could affect the review of research papers, and except for special issues on practical research, there is usually no categorizing of published papers as practical research papers or general papers. Therefore, in this study, a survey was conducted using the method described below, to determine whether selected published papers from the JSET contribute to theory or practice, and what trends exist in terms of the review process.

Selecting published papers for the review

Sample research papers for practical and general categories

To carry out the review of research papers, it was necessary to select representative published papers in two categories: practical research papers and general papers. Selecting papers for each category presented difficulties and challenges because papers were not published using these two categories.

So to select practical research papers, a method adopted in a previous study by Yoshizaki (2002) was again used. Using published papers from an educational technology journal (1987–2001 issues), that dealt with educational practice research, Yoshizaki reviewed and assigned these papers into four categories: Type I (development of research

techniques and tools), Type II (educational practices and factor analysis), Type III (improvement of educational practices and learning environment issues), and Type IV (development for practical teaching skills). In his report, Yoshizaki also explained the research approach and features for each type or category of practical research paper.

Yoshizaki's original categories were used to select published journal papers for this study. Three original papers from each of Yoshizaki's categories were chosen (total: 12). These twelve academic journal papers were used in this study as practical research sample papers.

The selection of general papers was as challenging as the selection of practical research papers. Eleven of the latest papers published in JSET journal Volume 27 (2) and Volume 27 (4) in 2003, and Volume 28 (1) in 2004 were selected (Vol. 27, No. 3 was not included because it was a special issue). In doing so, the possibility that practical research papers and general papers were both included in this particular set of recently published papers still exists. However, for purposes of this study, all published papers in this set will be referred to as general papers.

In total, 23 research papers were selected as sample papers for this study. The complete list of journal papers is given in the Appendix.

Reviewers

All of the selected sample papers went through the standard multiple review process prior to acceptance for publication, but it was not easy to review them again for this study because they dealt with various educational technology topics. Therefore, we asked a group of five active researchers to re-evaluate these papers. These reviewers, who are editorial board members of an educational technology society, accepted the invitation to review the 23 papers for this study, on the condition of anonymity.

Evaluation procedure

Prior to re-evaluating the 23 published papers, all reviewers were asked to answer a questionnaire (see Table 1) to establish their preferences with regard to the seven item review criteria developed in the first part of this study. Then they rated every published paper using the seven-item questionnaire in Table 2. The question items in Table 2 were derived from the questionnaire items in Table 1. The only difference between the two questionnaires is that for the Table 2 questionnaire, the rating scales were revised as follows: 1 = very poor, 2 = poor, 3 = neutral, 4 = Good, and 5 = Very good.

Table 2 Review items and standard statistics (Mean and Std)

Question item	Mean(SD)	General	Practical
1. Paper addresses a topic of societal demand	3.4(0.8)	3.5(1.0)	3.3(0.7)
2. Paper's originality exceeds that of previous studies	3.2(0.9)	3.1(0.9)	3.3(0.9)
3. Paper has immediate usefulness or application	3.0(0.9)	2.9(1.0)	3.0(0.7)
4. Paper has strong theoretical contribution to research	2.8(0.8)	2.8(0.8)	2.8(0.8)
5. Research was based on an educational practice	3.6(0.9)	3.2(1.1)	3.9(0.7)
6. Paper utilizes highly advanced research technique(s)	2.9(0.7)	2.9(0.7)	2.8(0.9)
7. Paper reflects high level writing skills	3.2(0.7)	3.1(0.6)	3.2(0.8)
Overall assessment or rating	3.1(0.8)	3.1(0.7)	3.2(0.8)

The questionnaire items in Table 2 were patterned after the same question items and the rating scales as in Table 1 so that the reviewers can provide ratings that are based on the same rubric. Then, factor scores of practical-oriented and theory-oriented papers were extracted using the factor-loading matrix in Table 1.

Review results

The average rates and standard deviations for the five reviewers and the 23 papers are summarized in Table 2. To compare the two paper categories (12 practical and 11 general papers), their averages were computed. The largest difference in averages between the two paper categories was for "Research was based on an educational practice" (Q5). This difference is the only statistically significant one ($t(88.4) = 4.2$, $p < 0.01$). Differences in averages for all other items and overall were relatively small.

From the above procedure, factor scores were extracted and results were summarized using a scattergram (see Fig. 2) where the two paper categories are shown separately. The deviation of the "practical-oriented" score for general papers is relatively large, while the one for practical papers is relatively small. To examine the differences between these two paper categories, factor scores were compared. Results indicate that there are no significant differences (practice-oriented: $t(82.3) = 1.1$, $p = 0.28$; theory-oriented: $t(111) = 0.2$, $p = 0.85$) between these two categories. For the second factor, "theory-oriented," the score is smaller than the one in Fig. 1.

In the first part of this study (review criteria), the survey items were applied to reviewers, that is, reviewers were asked of their preferences or the importance they assign to the seven review criteria items. In the second part of the study, the same seven items were used, but this time, they were applied to the published papers, that is, the overall quality of each published paper was assessed using these seven items. Although similar question items were used, the survey purposes were different, so it is hypothesized that differences in results will appear.

Results indicate that there was a significant difference only in the scores for the question item "Research is based on an educational practice." There were no significant differences

Fig. 2 Factor scores of 23 sample papers
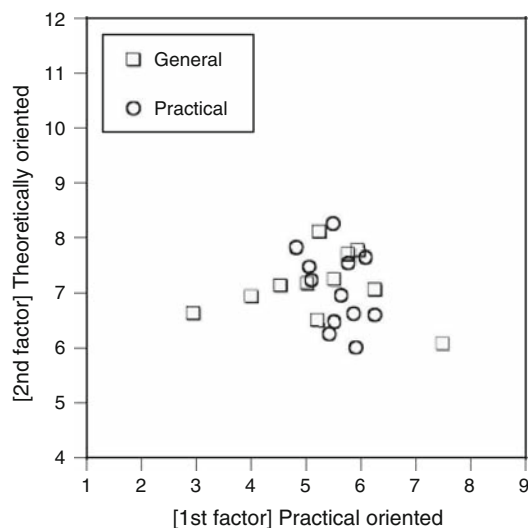
in the other review criteria items, and there was also no significant difference between the two categories of practical papers and general papers. The category "practical research paper" is being acknowledged in the field of educational technology. However, the lack of significant differences between practical papers and general papers that were reviewed in this study should be kept in mind and be considered seriously when pursuing the categorization of research papers in educational technology as "practical research papers."

As mentioned earlier, one of the more interesting results of this review of published papers is that most of the reviewers indicated a strong preference for the use of one particular review criterion, that is, "Paper is based on an educational practice" (Q5). To examine this further, the influence of the two factor scores on the overall review of each paper is analyzed in the next section.

A paper review model using a decision-tree

Analysis

In this section, the overall review score for each paper as a targeted value is analyzed using factor scores for paper content and reviewer's profile. The interaction between paper content and reviewer's preference profile is also analyzed. Again, it is not easy to make conclusions about the relationships resulting from the interaction, and revealing relationships is not the aim of this analysis, because of the limited number of reviewers and sample papers. The authors would like to consider instead the issues related to the paper review.

Although all variables are quantitative, a linear relationship among variables is not ensured, i.e., a paper that has high practical or theoretical factor scores is not always preferred over papers that are rated low for those factors. Therefore, the nonlinear classification decision-tree method (Quinlan 1986, 1993) was used to analyze this issue. As such, it was also necessary to convert the total assessment score from a five-point scale to a three-point scale: 2 = Poor, 3 = Neutral, and 4 = Good.

The following symbols are used in the decision-tree: decisions related to the paper are given in a rectangle using "p_practical" for a practice-oriented paper and "p_theoretical" for a theory-oriented paper. Decisions related to reviewers (or assessors) are given in a rounded-rectangle using "a_practical" and "a_theoretical" to indicate the reviewer's preference when reviewing papers as practice-oriented or theory-oriented. The result of the paper review (final assessment) is given in an oblong figure, and the final rating given follows the same three point scale used in the assessment: 2 = Poor, 3 = Neutral, and 4 = Good.

Results of analysis

The results of the decision-tree analysis are shown in Fig. 3. The decision tree consists of links and nodes for conditional approaches. This diagram indicates the review procedure for published papers. The most effective review criterion is designated to the root node, which is located at the top of the decision-tree. For practice-oriented papers, the root node affects the overall paper review when the threshold is 4.0 or greater. The threshold values for the root node and for each node in the decision-tree were the result of conditional parameters that were obtained by the analysis. The rest of the decision procedures are described in the next section.
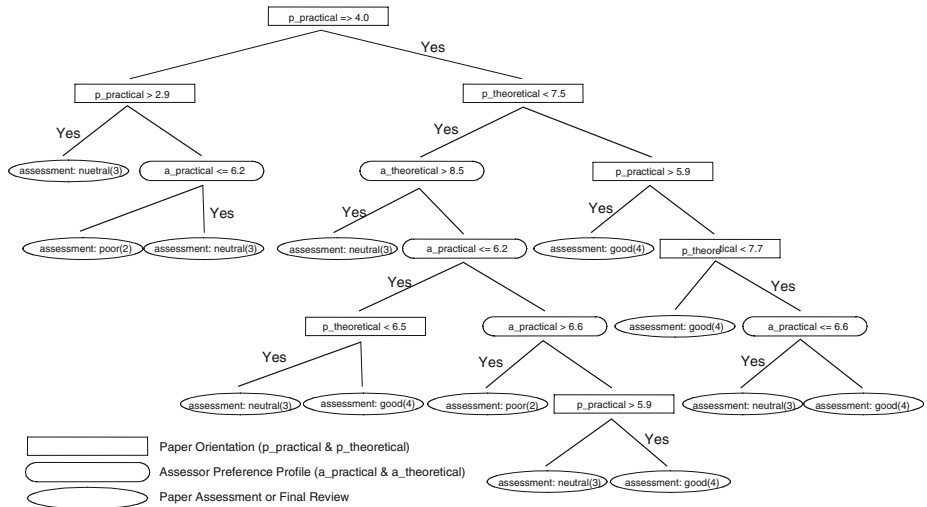
Fig. 3 Decision-tree analysis: results of paper review

Case: When score for paper's practical orientation is low

In this section, we will follow the flow from the root node going the left side, where the score for practical-oriented papers is lower than 4.0.

When the score for practice-oriented papers is between 2.9 and 4.0, the final rating given is three or neutral (neither practical- nor theory-oriented), and no other factors are considered (see Fig. 3). Similarly, papers with practical orientation scores lower than 2.9 got the same final rating of 3 or neutral, if the reviewer's practical orientation is less or equal to 6.2.

When the reviewer's practical preference score is higher than 6.2, the assessment turns out worse and the paper is given a final rating of 2 (Poor). This means that for papers with low scores for practical orientation, the final rating is influenced negatively by the reviewer's practical preference. Out of the 23 sample papers reviewed, only two fell into this category (low p_practical and high a_practical).

Case: When score for paper's practical orientation is mid-range or higher

If the factor score for a practice-oriented paper is higher than 4.0, the decision flows down from the root node to the right side of the decision tree and the next step is to take into consideration the paper's theoretical orientation, as follows.

(1) In cases where the paper's theoretical orientation score is low:

When the paper's theoretical orientation score is not too high (≤ 7.5), the final rating will depend on the reviewer's degree of theoretical preference. If the reviewer prefers research work with theoretical approach (>8.5), then the paper's final rating is Neutral (3).

When the reviewer's theoretical preference score is lower than 8.5, and his/her practical preference score is less than 6.2, then the paper's theoretical orientation score becomes the deciding factor. If this score is lower than 6.5, the paper's final rating is Neutral. If it is greater than 6.5, then the final rating is Good (4).

On the other hand, when the reviewer's theoretical preference score is lower than 8.5, but his/her practical preference score is higher than 6.2, and 6.6, then the paper is assigned to the Poor (2) category.

If the reviewer's practical preference score is between 6.2 and 6.6, then the paper's practical-oriented score is considered. If this score is greater than 5.9, then the paper's final rating is Good (4). Lower than 5.9 will bring a paper's final rating to the Neutral (3) category.

(2) In cases where the paper's theoretical orientation score is high:

The far-right side of the decision tree (Fig. 3) shows the flow when the paper's theoretical orientation score is higher than 7.5. This score plus a practical orientation score greater than 5.9, gives a paper the final rating of Good (4). When the practical orientation score of a paper is lower than 5.9 and the theoretical orientation score of the paper is greater than 7.7, the paper is classified into the Good (4) category. On the other hand, the paper is given a final rating of Neutral (3) when its theoretical orientation score is between 7.5 and 7.7 and the reviewer's practical preference score reaches or is lower than the threshold value of 6.6. The paper is given a final rating of Good (4) when its theoretical orientation score is higher than 7.7.

The results of the decision-tree analysis are summarized as follows:

A final rating that is low is mostly affected by the practical orientation score of the paper. Specifically, all papers that received low final ratings were papers that had low practical orientation scores. To get a high score in the final ratings, it is then necessary for authors to put more attention and consideration to the practical orientation of the paper.

To get a much higher score in the final ratings, the paper should be strong in both its practical orientation and its theoretical orientation. Specifically, a highly rated paper is assessed for its theoretical orientation, in addition to it being assessed highly for its practical orientation.

The paper's final rating is affected by the reviewer's practical preference. The higher the practical preference of the reviewer, then the higher also is the requirement for the practical orientation of the paper, and the lower is the requirement for its theoretical orientation. This tendency seems to indicate the current style of research papers in educational technology.

The above results suggest the possibility that paper reviews (or assessments) are strongly influenced by the interaction between reviewer characteristics and paper characteristics.

If this trend takes place during the regular review process of papers for publication, then the use of an established set of review criteria for papers on educational research practice must be required, to ensure the fairness of the review. Also, since this interaction could very well affect the acceptance or rejection of submitted papers, the reviewer should gain an advance and good understanding of his or her own review preferences or tendencies by using a questionnaire similar to the one used in this study (see Table 1).

Because paper reviews are actually based on peer review, and the reviewers and authors may have similar characteristics or preferences, the interaction described above, in most cases, may not affect the review criteria.

On the other hand, it is interesting to note that the differences in the review of research papers can still be compared using two factor scores, in spite of the progress that is happening in the field of educational technology research.

Fig. 4 Rating trends for published research papers
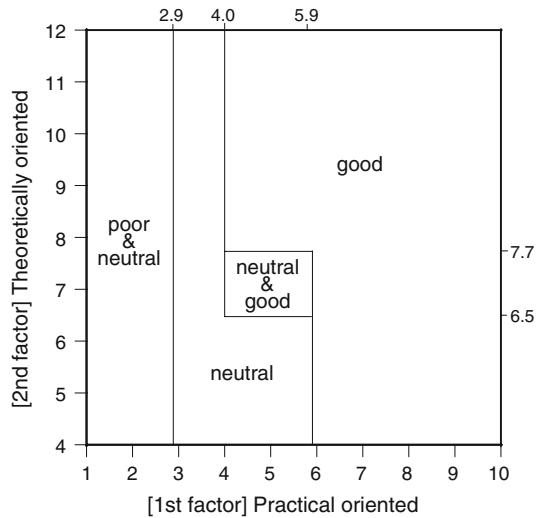
Analysis of trends in paper reviews

Classification using the decision-tree method is a detailed analysis, which considers the reviewer's characteristics. For the authors of submitted research papers, it is important to see the overall relationships between the final review results and the paper's orientation, to help improve the quality of educational technology research papers. The trend between the two factor scores when reviewing papers is illustrated in Fig. 4, which is a summary of the decision tree in Fig. 3. The horizontal axis indicates the practical orientation, while the vertical axis indicates the theoretical orientation. Each part of the figure shows the final rating that will most likely result from the paper review.

According to the illustration in Fig. 4, a paper that deals with educational technology research basically requires a minimum contribution to educational practice, and it also requires theoretical contribution to receive a higher rating. This assessment of a paper's educational practice contribution depends on the reviewer's practical preference and this preference affects the overall or final review score, as described in the previous section.

This result provides evidence that research in educational technology is recognized as a form of study that focuses on educational practices. This paper also provided instruments and a factor loading matrix that can be used for evaluating the practical and theoretical orientation of research papers. Every author can thus estimate the final rating or the possible assessment for his or her own paper, and gain a hint or two on how to improve the paper.

Conclusion

This paper conducted a survey and analysis of factors affecting the review of research papers, to examine trends in educational practice research in the field of educational technology.

Two factors, namely, practice-oriented and theory-oriented preferences, were extracted from 63 samples, and scores from members of a Japanese academic society were compared with the scores of its editorial board.

Results show that the two factor scores were not correlated to each other, and they are independent measures for any evaluation or paper review. There was no significant difference in the ratings between society members and editorial board members, and their preferences when reviewing research papers were identical.

For the second part of this study, a group composed of anonymous members of an editorial board conducted a paper review of 12 published "practical papers" and 11 published "general papers" and the results indicated that there was no significant difference between the two categories.

The final rating scores of these 23 papers were analyzed using a decision-tree rating model. Results indicated that research papers need a theoretical approach contribution in addition to basic educational practice contributions.

The results provide evidence that educational technology is an area of research that is based on educational practice research. This coincides with the definition of educational technology by Sakamoto (1971) who is the key figure and leader in promoting educational technology research in Japan.

As researchers in educational technology, we ought to be aware of the need to make an educational practice research contribution when writing research papers, and that it is advisable to assess the contribution that research papers have on educational practice by measuring, whenever appropriate, the paper's degree of practical orientation. This paper has proposed a set of review criteria for this purpose.

The authors hope that this paper will also contribute to the improvement of research, and of research methodologies as well, in the field of educational technology.

Appendix

List of Journal Papers used as Sample Papers in this Study (All papers have been published in the Japan Journal of Educational Technology)

1. Practice-oriented papers

a. Development and Application of a Method for the Analysis of Classroom Communication Process: Clarifying Structural Articulation Based on Words Frequencies, 23:1
b. Teacher Decision-Making When Faced with an Unexpected Classroom Response–The Relationship between Student Responses to Teacher Expectations and Teacher Reactions, 18:3/4
c. Structurally Describing Instructional Process and a Method for Analyzing Partially-Defined Sequences, 11:4
d. Role of Teacher's Repetition in Classroom Teaching, 23:4
e. Using a "Case Method with Visual Sense Simulation" for Investigating Kindergarten Teacher's Decision-Making, 20:2
f. Student Cognitive Processes during Classroom Instruction -Based upon Student Reports during Stimulated-Recall, 16:1
g. Ethnography of a Learning Environment for Generating Narrative in Learning Processes, 23:1

h. Learning Environment Design to Foster Computer Mediated Communication Ability, 23:1
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