

Using Response Cards in Teacher Education — A Case Example in Taiwan

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Abstract

Using response cards is one strategy to increase active student response. This approach may also satisfy a unique cultural learning need in some cultures like Taiwan where students are hesitant to speak in class. This paper provides a case example of using personal writing boards (PWBs) as an alternative response option to improve student participation during pre-service teacher education in Taiwan. Additional features of the PWBs were designed to respect and accommodate student preferences and learning needs. The author identified six implementation steps, a demonstration of implementation, and six functions of using the PWBs. Evaluation of using PWBs from an anonymous student self-report survey showed positive results on satisfaction, preference, response rate, and attention span when compared with classes not using PWBs. This example provides implications for teachers working with pre-service teachers and diverse learners such as international students or students with special needs.

Keywords: Personal writing board, active student response, class participation, teacher education, higher education, response cards

Introduction

The opportunity to respond synonymously during academic learning time increases active student participation which is the key to learning (Heward, 1994, 2003). Active student participation/response is positively correlated to increased academic performance and learning outcomes (Dale, 1969; Heward, 1994, 2003; Kellum, Carr, & Dozier, 2001; Randolph, 2007). Moreover, increased student engagement in response to instruction eliminates wasted time and improves on-task behavior and school performance (Blackwell & McLaughlin, 2005). Many instructional strategies designed to promote active student response have been studied, including response cards (Heward et al., 1996; Shabani & Carr, 2004), guided notes (Blackwell & McLaughlin, 2005), choral responding (Narayan, Heward, Gardner, Courson, & Omness, 1990), clickers (Graham, Tripp, Seawright, & Joeckel, 2007; Heaslip, Donovan, & Cullen, 2014) and web-based instant feedback systems (Ward, Reeves, & Heath, 2003). Among these strategies, the use of response cards is the most examined strategy with more than 30 studies published in the Western predominated literature (Randolph, 2007).

Response cards are defined as reusable cards, signs, or items that are held up simultaneously by all students in the class to display their responses to questions or problems presented by the teacher (Gardner, Heward, & Grossi, 1994; Heward et al., 1996). They have been used for instruction in diverse class subjects and settings, and with students of all education levels with and without special needs (George, 2010; Randolph, 2007). The use of response cards is also a commonly adopted teaching strategy for school-aged children with and without disabilities (Cakiroglu, 2014; Gardner et al., 1994; George, 2010; Munro & Stephenson, 2009). In higher education courses, teacher-student interaction is frequently inhibited by one directional lecture method and large student enrollment. When response cards were used in university courses, it was found that the use of response cards resulted in undergraduate students' higher scores, greater participation, and favorable evaluation in the United States (Kellum et al., 2001; Marmolejo, Wilder, & Bradley, 2004; Shabani & Carr, 2004). However, the research in this area and application of response cards in teacher education and in Eastern settings, such as Taiwan was limited.

Handheld Response Cards: An Alternative Simultaneous Responding Option

Handheld response cards are user-friendly compared to high-tech strategies, due to low cost and simple training. There are two commonly used forms of response cards: pre-printed index cards for selection responses and write-on, dry-erase boards for constructed answers. Both have been shown to enhance classroom active participation and learning (Shabani & Carr, 2004). Compared to selection responses, constructed answers might result in better

student performance

and higher levels of thinking. It was also reported as being used more frequently in adult learners, but hand written cards can be more difficult to read and take more time to write and respond (Blackwell & McLaughlin, 2005; Shabani & Carr, 2004).

Most studies reported the following advantages of using response cards both in pre-K to 12 and adult learners: a) increased students' active class participation and willingness to participate, offered immediate feedback to the teacher, improved test achievement, and decreased distraction and disruptive behaviors (Kellum et al, 2001; Randolph, 2007); b) most students liked to use response cards and believed they increased their test scores (Kellum et al., 2001; Narayan et al., 1990); c) the cards supported teacher-directed large-group instruction (Narayan et al., 1990); d) the immediate visual student response enables the teacher to assess, modify, revise, or continue instructions and curriculum (Bennett, Blanchard, & Hinchey, 2012; Gardner et al., 1994; Randolph, 2007); and e) the low-tech strategy which could be widely applied in a range of school contexts (Narayan et al., 1990; Randolph, 2007). Randolph (2005) also identified disadvantages of using response cards: a) sometimes it is difficult for teachers to read messy writing; b) distributing materials takes away from instructional time; and c) some older students reported that using response cards felt somewhat childish.

Response Cards versus Hand-Raising

While the benefits of handheld response cards continue to be published for class instruction, it is important to consider this practice in contrast to commonly used traditional methods of encouraging student participation, such as hand-raising. Traditionally, students who wish to speak raise their hand and a teacher calls on them. Show of hands has been a popular and fast way to convey decision making or ask a question and has the irreplaceable feature of being easy to use outside the classroom when carrying other props is not feasible, such as during field trips.

However, compared with response cards, hand-raising is recognized as a practice that may limit academic engagement and performance for students with and without special needs (George, 2010; Randolph, 2007). Moreover, hand-raising only allows students to respond one by one when called upon, which can be a) challenging to reach all students within a given amount of class time, b) difficult for students who are not comfortable expressing thoughts when they are put in the spotlight, and, c) distressing for those who require more time after the presentation of the questions.

These aforementioned limitations of hand-raising can potentially be addressed by using

response cards instead. A number of studies investigated different student outcomes between response cards and hand-raising. The use of response cards has shown promising results for increasing active student engagement and opportunities for academic response during large-group instruction (Gardner et al., 1994; George, 2010), as seen in higher frequencies of responses and student initiation (Munro & Stephenson, 2009; Narayan et al., 1990; Randolph, 2007). A meta-analysis showed most students performed better with response cards than hand-raising condition. The majority of students (>80%) also preferred using response cards to hand-raising. Additionally, test scores rose from 41.8% to 52.1% when response cards were used. There was also a 35.6% higher level of participation and 42.3% lower intervals of off-task behavior (Randolph, 2007).

It is possible to transfer the function of response cards to hand-raising, but this limits the question types to dichotomous, simple multiple choice and two-digit summation answers. For example, the teacher asks a question, and then all students either make a response or not. These responses can take many forms including raising or not raising their hands; using a thumbs up or down gesture; making a circle with arms over head or a cross in front of chest; or, using numbers of fingers to indicate their meaning or answer.

Cultural Aspects of Response Options: A Case Example in Taiwan

The adoption of traditional lecturing approaches (one-way teaching and learning model) has been dominant in higher education in some cultures, such as Taiwan for many years. This preference of teaching was thought to be the most expedient and effective way to impart knowledge (Shabani & Carr, 2004). Under this approach, students have been influenced by Confucianism (e.g., Confucian Analects [LunYu]) to respect the teacher's authority by being attentive or taking notes. Students are also expected to take full responsibility for their own learning. Sometimes, the teacher invites questions from students, but often students do not respond and hand-raising is scarce. The hesitance may be due to avoiding the chance of losing face in public (Ho, 1976) by revealing ignorance of lecture content or by inadvertently questioning the teacher's knowledge and disrespecting the teacher's authority. The influence of Confucianism also suggests that teachers earn one of the highest reputations among many other occupations. Teachers are expected to excel in extensive knowledge and pass on their knowledge through lecturing. On the other hand, teachers may also be concerned about saving face by making sure lecture content is unquestioningly accepted. However, if lectures are not well-designed, students may be shaped to be passive learners and can be hesitant to raise questions.

Lecturing may be the most effective approach to impart large amount of information within a limited time. Yet, lecturing may not be effective for student construction of new knowledge without prior appropriate knowledge preparation (Schwartz & Brandford, 1998).

It is also not effective to merely expose students to knowledge content through lecturing when there is too much teaching and too little learning (Lujan & DiCarlo, 2006). There is a saying that when you are always fed with the best food, you earn no taste on food (this metaphor implies knowledge). The question of how to motivate students and emphasize student autonomy in education has moved the teacher-centered ‘taught’ and ‘being fed’ education toward student-centered ‘eureka’ and ‘food growing’ approach. One way to achieve this goal for teachers is to ask good questions (Steinert & Snell, 1999). Although challenging in Taiwan, it is critical to increase student response rates from a few to more or all of a class responding. In the past decade or so, Taiwanese society has transformed education, and practitioners and researchers have devoted efforts to address the need for curriculum and teaching approach modification or innovation.

This paper provides an example from a University classroom in Taiwan to scaffold student-centered learning and how the teacher facilitated student active participation by purposively posing questions and encouraging the use of personal writing boards (PWBs). PWB is a mode of write-on-form response card. The author used PWBs in two classes of an identical course of pre-service teacher education in the same semester offered by the Department of Special Education. There were 92 undergraduate students in total, 44 of them from the Department of Special Education and 48 of them from a mixture of other Departments, such as Arts, Chinese, Electronic Engineering, Human Development and Family Science, Industrial Education, Mathematics, Music, Library and Information Science, Physical Education and so on. The students were 18 to 20 years old, 25% were male and 75% were female. All of the class seats were arranged facing towards the instructor in rows.

The PWBs and materials

In this example, five material items were used for implementing the PWB procedure: the PWBs, printed name or attached name tags, speaking mood indicators, dry erase markers, and tissue paper for erasing answers. Each student was required to have a PWB. There can be many types of PWBs, but they should all be inexpensive to make or purchase, portable, writable, approximately A3-sized (11x16 inches), and reusable. One type, for example, is a simple white erasable plastic flexible sheet that can be stuck on cardboard (similar to: <http://www.magicwhiteboardproducts.com/products> or http://www.magruba.com.tw/en/pro_material_01.php). Instructors may also use a cardboard piece put into a purchased transparent plastic protector as a PWB. In addition, a 4-hole-A3(11x16 inches)-sized-binder may be used for storage.

The mechanism of using speaking mood indicators was created to allow students to show their comfort level and choose the frequency of being called on. Indicators in three colors or simply two is sufficient. Red meant “bad mood: don’t invite me for speaking;”

yellow meant “so-so mood: invite me for speaking when the question is easy or in the second round;” and green meant “good mood: always invite me for speaking.” Students could create their own shapes of indicators, such as pictures of fruit, colored magnets, cartoon cue cards, as long as the object color was recognized for the indicated speaking mood. Every student used one that represented the speaking mood on the PWB and changed the indicator as often as he/she needed.

Implementation Steps

The following PWB implementation steps were embedded in the lecture. A demonstration using the six steps was provided after introducing each step.

Step 1. At the beginning of every class session, students were asked to "prepare for class" as a routine (i.e., take one PWB, several marker pens, and tissue paper, write name, and attach the speaking mood indicator). The instructor started the class by asking students "please raise your board if you are ready for class" and confirmed readiness.

Step 2. In the first class session, students practiced using the PWBs with some easy questions (e.g., what is the title of the class?) to prepare for general usage. For those questions they were not able to answer, they could simply choose not to raise the board or write "I don't know."

Step 3. During the class, the instructor posed either open-ended or closed-ended questions based on content prepared prior to class or onsite as needed. Open-ended questions such as “Do you agree with _____ (a certain learning theory)? Why or why not?” Closed-ended questions such as “What listed target skills are appropriate for using a shaping strategy?” Students were expected to write down only the key words with the font size identical to the palm of their hand so that the print would appear readable to the instructor.

Step 4. The instructor announced the amount of task time - usually between 10 seconds to 1 minute to maintain the momentum and counted down the seconds by snapping fingers.

Step 5. After saying: “Time’s up. Hold up your writing board,” the instructor read through some answers on the PWBs, called the student's name, and invited the students who indicated “green” as their speaking mood to elaborate their answers. If time permitted, the instructor prompted the students who indicated yellow to speak in the second round and acknowledged the students who indicated red. In order to encourage student participation and communication, the instructor always provided positive feedback when student’s response needed clarification, such as “your answer is absolutely related. If it is under...condition, it would be a better answer” and “this answer is interesting. We can all think about it. Another

way of thinking will be....” This is to provide a safe and positive learning environment for students to interact in class.

Step 6. The instructor determined from the student responses whether the topic was clearly understood by the students and decided whether to continue to the next topic or to provide further clarification or support using a different strategy.

If necessary, the instructor can ask students to turn their PWB around for peer sharing and commenting. The PWB can also be used for many other types of class activity, such as small group brainstorming project.

Respect and accommodations for student preferences and autonomy

Although group instructions are often unified in nature, using embedded individualization and student preferences is ideal and possible. In order to enhance a positive relationship between the teacher and student, to acknowledge and empower every student to respond, and to respect and accommodate their learning needs and choices, names and speaking mood indicators were asked to be printed or attached on the board each student chose.

The role of the instructor is to scaffold student participation based on learner preferences, such as inviting written response elaboration of students with a green mood indicator, and by providing alternative PWB responding options, wait times, and affirming corrective feedback. The instructor also facilitates students’ adaptation to frequent responding from simpler to more complex questioning. The instructor practiced what she teaches in her role as a teacher and modeled effective teaching strategies along with the PWBs which served as good models for students, who are future teachers, to use in their future classrooms.

Functions of the PWBs

The use of PWBs in a large class has at least the following functions:

1. PWB provides continuous assessment of every student’s performance. The course content and pace are decided accordingly.
2. PWB eliminates incompatible learning disruptive behaviors, such as texting and dozing.
3. PWB balances the frequency of the students who are and who are not speaking often.
4. PWB allows time delay for thinking and serves as a visual support to facilitate participation of the quiet or shy students.
5. PWB encourages teacher-student and peer-peer interaction.
6. PWB can be used for multiple purposes and activities.

Evaluation of using the PWBs

A good teaching strategy or approach includes not only what teachers do and think, but also how students perceive the strategy. The significance of on-going assessment on student academic performance as well as evaluation of the effectiveness of using the PWBs cannot be stressed enough. PWBs serve as a mechanism for academic modification and improvement. A student self-report anonymous survey was disseminated to evaluate using PWBs as a routine part of a course. It was distributed at the last session of the course. The students had a choice of whether or not to return the survey. The survey is illustrated in Appendix 1.

Results of Questionnaire

There was a valid response rate of 94.3%; in total, as 82 students completed and returned the questionnaire.

Positives. The students returned the surveys with very positive evaluations. Of all students, 88% liked PWBs and 75.6 % (70.6% of all students from Department of Special Education and 83.9% of all students from other departments) would use PWB if given a chance to choose. The top four selected reasons were (highest to lowest in order): increased response rate, interesting, enhanced thinking, and interested in knowing others' thoughts. Students also wrote other reasons. Many of them mentioned that it created opportunities for shy students to avoid the fear of raising their hand. They felt by using PWBs, the expression could happen freely whenever and in creative ways on the board. It was a friendly way to express ideas without needing to speak and increased learning efficiency. In addition, regardless of the colors of the speaking mood indicator, 63.4% of students expected the instructor to read out their answers on the PWBs.

Negatives. There were still some students who did not like PWBs (12%) and would not be willing to use them if given a chance to choose (24.4%). Their reasons included: do not have enough time to write; do not like to express in class in general; inconvenience in carrying/storing the materials; and difficult to manage the multi-tasking of taking notes and writing on the boards simultaneously.

Response rate and attention span. The Statistical Package of the Social Science Program (SPSS) for Windows 17.0 which runs paired t-tests were applied to test for the differences of attention span and response rate between this class using PWBs and other classes without using PWBs. Response rate paired-t tests were based on the self-report survey item numbers C & D answers on the survey; attention span paired-t tests were based on item numbers E & F answers on the survey. A value of $p < .05$ was considered statistically significant. Students taking the course and using a PWB showed a significant increase from

taking other classes without using PWBs in both response rate ($t = 8.22, p < .01$) and attention span ($t = 2.79, p < .01$).

Discussion

This study revealed that PWB strategy was able to improve undergraduate students' response rate and attention span in a special education pre-service teacher education course in Taiwan. The study assumption was that opportunity to respond increases students learning by engaging more in instruction and alleviating the wasted time and thus results in more on-task behavior and better school performances (Blackwell & McLaughlin, 2005).

Response cards, a research-based instructional strategy, simultaneously held up by all students in response to a question by the teacher are an effective way of increasing student participation and learning when compared to the one-student-answering-at-a-time method of participation in the classroom (Cavanaugh, Heward, & Donelson, 1996). This study extends previous western research by investigating the effects of response card in eastern education settings. Results of this study support the notion that the use of PWBs in university classrooms is also beneficial in eastern societies such as Taiwan.

PWBs are inexpensive low-tech, responding enhancing tools and these results confirm PWB is a transculturally congruent teaching strategy. In this study, most participant students liked to use a PWB and hoped to continue using it. This finding is congruent with other active student response studies in higher education classrooms, such as Heaslip et al. (2014) using clickers in accounting class with 120 students. It significantly increased active class participation and learning motivation which was operationally defined as response rate and attention span for participant undergraduate students. In addition, the researcher also found that PWBs provided an equal opportunity for both active and passive students to express. Some respondents mentioned that PWBs helped those who were not used to speaking and those students who were considered to be "shy."

The interactive mode transformed the one-way communication teacher-centered pedagogy (e.g., through lectures and assigned readings) into a two-way, learner-centered andragogical approach, especially when the classroom seats are arranged in an arc or circle or when the teacher simply asks students to turn the PWB in a circle so everyone in the class could see the response on the board. Finally, compared to using hand-raising, if necessary, student answers can be kept confidential by all PWBs facing towards the teacher. There is a traditional saying 'silence is the gold' in the hierarchical society of Taiwan; those who are well positioned in the hierarchy are more appropriate and have authority to express opinions. Thus, most students are silent and teachers are often expressive. In addition to the effect of enhancing attention span, the PWB is a cost-effective teaching strategy to overcome the

cultural influence of “silence” through the encouragement of student responses.

Universities are learning communities, and the learner has social responsibilities as a participant, since she/he will be tomorrow’s teacher/master, and needs to be more than merely a passive recipient of information (Karakitsiou, et al., 2012). The results of the study echo some Western studies (Kellum, Carr, & Dozier, 2001; Randolph, 2007) which conveyed the advantages of using response cards in university level students. Firstly, the PWB provided the instructor visual access and ongoing assessment which fostered a climate of learner inquiry and accept formative feedback from learners to retool teaching (Bennett, et al., 2012; Gardner, et al., 1994; Randolph, 2007). Secondly, the PWB allowed non-transient visual stimuli to remain longer than transient sound stimuli which fostered the students’ attention span. Thirdly, while hand-raising requires almost no extra time for one person to respond, other students are not easily able to respond at the same time. So while using a PWB might take more time, overlapping responses are possible. Fourthly, the PWB mimics the written mode of communication (versus speaking mode) of the digital century which may activate learning by seeking silent learners’ input. As described by participant undergraduate students, using a writing board in class can effectively enhance interest, attention, and communication, and is a friendly way to express ideas and reduce social anxiety. It is evidenced from this study that PWB is able to create an interactive classroom atmosphere and to stimulate the motivation of students in attention and response.

This study did not find the disadvantages concluded by Randolph (2005), maybe because the researcher used the following principles by Randolph: (a) standardize the procedure for distributing and collecting response cards and markers; (b) keep a fast rate of presentation of the response cards; and (c) provide practice opportunities before intensive usage of response cards. Our participant undergraduate students did not think it was childish at all but few liked the way it resembled the television program in Taiwan. Instead, the researcher found that students who were not willing to use PWBs gave the following reasons: do not like to express in class; inconvenience in carrying/storing; and multi-tasking of taking notes and writing on the PWB simultaneously.

This study had some limitations. First, the use of a convenience sample may limit the generalization. Second, the survey assessed a single point in time, so whether effects of PWB could be sustained over time is unclear. Third, the measurements of response rate and attention span are self-reported measures; it is probable that this procedure can lead to overestimation or underestimation when compared with independent observers.

There are several issues regarding the use of PWBs which merit further reflection and research. First, as the course proceeded, fewer students held up their board or used their learning condition/mood indicators. This may due to one or more reasons including students simply choose not using it or being satiated; teachers losing momentum of using it. However,

response rates using PWBs still remained significantly higher than the hand-raising. Second, the learning mode for some students was already primed towards being a good listener and note taker. So perhaps using the PWB to activate student response was a challenge for them to share thoughts by writing in the classroom at the same time. In this case, the teachers may arrange students who prefer hand-raising to sit with audio-preferred students in an assigned area, thereby accommodating multiple learning modes and learning needs. Third, the implementation of PWBs may also influence teacher behaviors, such as the numbers and types of questions posed in the classroom which means providing opportunities and expectations to respond.

These factors may all require time for both teacher and students to familiarize with an alternative response option different from the traditional lecturing and hand raising. Lastly, it would worth investigating in what settings (e.g., classrooms, lecture halls, meetings, and conferences), what types of classes (e.g., literacy, math, philosophy, research methodology, different sizes of the class), and for what educational levels the different modes of student responding (e.g., hand-raising, choral responding, response cards) work best.

Conclusion

The findings of the current study indicate that PWB, with explicit use of features such as mood indicators, systematic movement from simpler to more complex questioning, wait time, and affirming corrective feedback, appears to be an effective means of increasing opportunities to respond and active learning in an undergraduate pre-service teacher education class in Taiwan. Teacher educators may apply the response card such as PWB to classroom settings of any education level and with diverse students where active student participation is encouraged. This example provides implications for teachers working with pre-service teachers and diverse learners such as international students or students with special needs. It is a good reminder to consider the cultural context of classroom structures, expectations and requirements for individual students.

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Appendix 1. PWB Evaluation Form

A. Do you like or dislike the PWB and why?

I like it. Why? (check all that apply)

- interesting interested in knowing other's thoughts more attentive to class
- enhanced thinking increased response rate created a sense of achievement
- other reasons _____

I don't like it. Why? (check all that apply)

- not interesting not interested in knowing other's thoughts less attentive to class not enhancing thinking not increasing response rate not creating a sense of achievement
- other reasons _____

B. If you were to choose, would you choose to use the PWB?

- Yes, why? _____
- No, why? _____

C. What is your average response rate (any forms of response) per class session to instructor's questions or comments in other courses without using the PWB?

- 0% 1-20% 21-50% 51-80% 81-100% student response was not expected at all

D. Compared to other courses without using PWBs, what is your average response rate (any forms of response) per class session to instructor's questions or comments in this course?

- 0% 1-20% 21-50% 51-80% 81-100% student response was not expected at all

E. What is your average attention span per class session in other courses without using the PWB?

- never attentive 1/3 of class session attentive 1/2 of class session attentive
- 3/4 of class session attentive always attentive attention span is not related to PWB

F. Compared to other courses which do not use PWBs, what is your average attention span in this class per class session

- never attentive 1/3 of class session attentive 1/2 of class session attentive
- 3/4 of class session attentive always attentive attention span is not related to PWB

G. Does it matter if the teacher reads your answers on PWB?

- better not to read my answers doesn't matter I expect my answers to be read

Please share any thoughts of using the PWB and the ways to enhance the function of the PWB. _____