11-2008

Grouping & regrouping using Mixintools: An exploratory study

Richard G. Berlach
University of Notre Dame Australia, rberlach@nd.edu.au

Keith McNaught
University of Notre Dame Australia, kmcnaught@nd.edu.au

This conference paper was originally published as:
Berlach, R. G., & McNaught, K. (2008). Grouping & regrouping using Mixintools: An exploratory study. *Australian Association for Research in Education International Education Research Conference.*

BER08650

Grouping & regrouping using *Mixintools: An exploratory study*

Richard G. Berlach **Keith McNaught**

University of Notre Dame Australia
19 Mouat St, Fremantle, WA, 6959.
Phone: (08) 9433-0151
Fax: (08) 9433-0160
e-mail: rberlach@nd.edu.au

Paper presented at *The Australian Association for Research in Education* International Education Research Conference, Queensland University of Technology, Kelvin Grove Campus Brisbane, Australia.
Nov 30 – Dec 4, 2008.

Grouping & regrouping using *Mixintools: An exploratory study*

Richard G. Berlach Keith McNaught
School of Education
The University of Notre Dame Australia
(Fremantle Campus)

Abstract

On a regular basis, teachers find it necessary to place children into groups for instruction. Random assignment is typically the norm when group composition is immaterial to the task. When member-sensitive groups need to be created, teachers might associate specific assignment with colours, numbers or other coding systems. Mixintools offers the teacher a strategy for creating groups in an enjoyable, expedient and variable fashion. Or does it? The purpose of this research was to determine whether the resource had any value from the perspective of both the teacher and the student. Data were sourced from three primary schools and one university teacher education class regarding the usefulness of Mixintools. Results indicated a mixed response. Reasons for this are reported.

Conceptual Mapping

Considerable evidence exists to support the value of group-based collaborative learning approaches in educational settings – from the early work of Schmuck and Schmuck (1975) and Good and Brophy (1978) for example, to the more recent of work of Aronson and Patnoe (1997) and Brady (2006). Less evidence-based research, however, is available on group formation techniques.

The emphasis on socially constructed models of learning (Luria, 1987; Vygotsky, 1978, 1962/1934) has led to a renewed interest in the development of cooperative/collaborative learning strategies (e.g. Bennett & Rolheiser, 2006; Cooper & Edwards, 1997). As a result, teachers are often searching for ideas about how to place children into groups. Typical strategies include teacher determination, child self-designation, use of numbers and methods favouring symbolic representation. The perspective of Johnston (2008) might be typical of those sentiments echoed by teachers as far as the purpose for the formation of groups is concerned:

> Many teachers do not count off randomly to put together diverse groups. I have a great respect for teacher-made groups where the teachers put together the groups. Perhaps there are two students who should not meet yet, or just the person to be able to draw out a shy student? One

> thing is clear. The traditional "chose your own groups" usually turns out to have students who are very much like each other with the same strengths and the same weaknesses and they often finish the assignment as quickly as they can with as little thought as possible. They make no new friends and often can't name more than half the class after several weeks in the same classroom. We advocate variety and changing the groups often so that students realize that they will eventually work with everyone in the room. After all, they are all your classmates. We look forward to the time when someone who says they don't want to work with a boy, says, "Put me with anyone!" (pp. 1-2)

Mixintools is a unique, Western Australian designed resource for grouping students. It is not intended for the purpose of facilitating group dynamics or processes but rather, for assisting in strategic group formation. The intention of its creator (O'Neil, 2007), was to provide teachers with a flexible strategy for forming purposive groups. Purposive grouping, which is usually tied to curriculum intention, is likely to have greater educational merit than the "form your own groups" scenarios described in the citation above.

Mixintools consists of a set of cards – similar in look to playing cards – arranged around the concept of a Latin square. A Latin square is an $n \times n$ table filled with n different symbols in such a way that each symbol occurs exactly once in each row and exactly once in each column. *Mixintools* has 6 categories of universally recognisable symbols (insects, fruit, musical instruments, Australian animals, plants and marine animals) and allows for the grouping and regrouping of students for up to six rounds into groups of 3, 4 or 5. The cards can be used with a class of between 20 and 35 students. There are 8 sets of laminated cards (in a neat storage packet) with the grid on the instruction sheet cueing the teacher as to which set to use to create a desired grouping profile. The material comes with a wall chart and a CD for recording interactions or results, if desired.

Aims & Research Questions

Although this group formation resource has indicated that "grouping can now be fun, fast and effective" (O'Neil, 2007), no formal research has been undertaken to substantiate such claims. This small research project aimed to do precisely that.

Mixintools makes significant claims regarding its effectiveness and these form the questions to be researched. Bearing in mind that the purpose of this research is determine the usefulness of a particular resource, the key questions revolved around durability, ease of usage, attractiveness to children, value of support materials, and value for money. To support these broad questions, a Likert-type repository of subsidiary questions was created for both teachers and students.

Teacher questions requiring Likert-type responses:

- I found the cards easy to use.
- I would consider the cards to be durable.
- The instructions provided were useful.
- The cards themselves have visual appeal.
- For the purpose of forming groups, these cards are more interesting than other group formation methods I have previously seen.
- Having pictures on the cards has greater appeal for the grade I teach than would say, numbers, letters, or symbols.
- The children seemed to enjoy this method of group organisation.
- I found educational uses for the cards other than those suggested with the materials.
- I utilised the CD which accompanied the cards.
- I found the accompanying wall chart to be useful.

Teacher questions requiring open-ended responses:

- If you were to purchase a pack of *Mixintools* card, how much would you be prepared to pay and why?
- Prior to using *Mixintools*, what would be your preferred method for organising students into groups?
- How much time have you saved or lost by using *Mixintools* as opposed to your preferred grouping method?
- How cooperative have your students been when using the *Mixintools* as opposed to your preferred grouping method?
- What features of the *Mixintools* cards do you value the most?
- Did you find any features of the *Mixintools* cards frustrating?
- What improvements can you suggest for the *Mixintools* package?
- Are you planning on using these cards again after the trial?
- Any further comments?

Student Likert-type questions:

- I found the cards easy to use.
- I liked the pictures on the cards.
- The cards were fun to use.
- I would like to continue using the cards for being put into groups.
- I had different people in some of my groups.
- I like working with different people.
- I like working in small groups.
- Would you like to say anything else about using the cards?

Methodology

Three primary schools agreed to trial the materials, one each from the government, Catholic and independent sectors. Schools also agreed to trial the materials in all three levels – junior, middle and upper – thus giving a total of nine classes totalling over 220 children. The trial period was 10 weeks (or one school term in Western Australian schools). Three 3rd year BEd (Primary) students from the University of Notre Dame Australia (Fremantle Campus), after receiving appropriate training, acted as research assistants (RA). Their role involved ensuring that the appropriate consent documentation had been completed; briefing teachers on the resource; supporting teachers during the trial; and collecting and analysing the data received.

Teachers were briefed by the RAs and provided with a comprehensive but not exhaustive list detailing how the cards could be used. It was hoped that the provision of ideas might increase a teacher's repertoire in terms of how the cards might be used. The following ideas were provided:

- Shuffle the cards then randomly hand them out to the students, once each has a card have students form groups according to same picture in a category. For example, all those with a picture of a banana form a group all those with a grape form another and so on. Once they are in their groups you can change them around by choosing a different category.
- Also, once the students have been placed in their groups they can keep the cards and the teacher can use them to give instructions, for example, call all those with a blue card to collect the resources needed for their group or use the colours to assign roles within the groups. They can also be used to rotate members, for example, all those with a yellow card move to the next group, the next time call a different colour card and so on.
- A more basic way of using them is to randomly hand them out to students then have them form the groups by colours, for example, all those with blue cards form a group, all those with red form another and so on.
- Excursion grouping.
- Categorise students according to their abilities or alternatively a mixture of abilities so that cooperative learning can be initiated.
- Out of the classroom. For staff professional development. An effective way to group a large number of people.
- Group for different work stations operating during a lesson.
- Grouping for the purpose of engaging students in projects.
- Perhaps in the upper years they can be used by the students for student initiated activities such as prefects organising a fun sports day (in conjunction with their teacher).
- For a random, or conversely designed, selection of group leaders.
- Organising a class 'chore (duty) list' by categories.
- Organising children by ability across different learning areas (e.g. could be in animal for maths, musical instrument for science, etc).
- Children just using the cards to have fun…e.g. a variant of 'snap'.
- With younger children a bingo-type recognition game covering the pictures as they are called out by the teacher.

Teachers agreed to use the cards on at least 10 separate occasions prior to completing the evaluation form. As it was thought that, in the main, information gleaned was not likely to be grade sensitive, teachers in each school were asked to confer and complete the evaluation sheet together. Where grade differences were apparent, teachers were asked to note these.

Apart from school participation, it was decided to obtain data from future teachers, as it was thought that this group might provide a different perspective on the resource. The cards were therefore also used with a group of final year Bachelor of Education (Primary) students from the University of Notre Dame Australia (Fremantle Campus), who were enrolled in a mathematics unit. This unit was chosen as the nature of the curriculum allowed for authentic integration of the cards – students were able to use the cards during scheduled activities which required that groups be formed. Evaluations for this group used descriptive techniques where students were asked to present opinions relating to strengths of the resource, issues relating to pedagogy, resource deficits, and overall recommendations.

Findings

Schools are busy places! The truth of this statement became evident when completed evaluations were requested by the RAs. Not all teachers who had initially agreed to take part in the trial actually followed up on the agreed level of participation. Others did not want to complete the Likert-type questionnaire but simply preferred to give a verbal report to the RAs. Nevertheless, sufficient information was accumulated in this exploratory study to provide a fair indication of how the *Mixintools* resource was being received by teachers. Overall, teachers felt that although the resource had some merit, it was not superior to other methods that teachers were currently using. Teachers also felt that instructions which came with the resource were too ambiguous and that at least one of the pictures was difficult to categorise. it was also thought to be too expensive for a resource of this type. A summary of findings is presented in Table 1.

As evaluations by children clearly relied on teacher support, in the two cases where this was not forthcoming, data retrieval proved to be problematic. Also, as one of the junior primary teachers (year 1) believed that the evaluation form was too advanced for her children, responses were made via symbols (smiley, neutral and unhappy faces) and recorded. Overall, the children liked the cards from an aesthetic point of view. The fact that the majority seemed to enjoy working in groups, together with the novelty element, probably meant that 'selling' the cards to students was not difficult. A summary of findings is presented in Table 2.

To complement the school-generated data, information from student teachers was generated. In the main, student teachers appeared to be a good deal more analytical than their busy classroom-based colleagues. Although they felt that the

resource had positive aspects, they too indicated that concerns generally outweighed benefits. Student teacher data is presented in Table 3.

Table 1
Summary of Findings by Categories: Primary School Teachers

Category	Government School	Catholic School	Independent School
Ease of use.	Positive responses received.	Ease of use increased with familiarity.	Ease of use increased with familiarity.
Provision of clear instructions.	Positive in terms of understanding how the cards were to be used.	Two of three teachers found that the instructions were difficult to follow…the grouping table did not help.	Some teachers clearly misunderstood how the cards worked, or founds the instructions confusing.
Overall appeal.	Generally positive stating that the pictures had visual appeal to all primary students. Spiders classed with insects, which they are not.	Positive. Allows teachers to place into homogeneous, task, friendship, random, gender, research, etc. groups. Allows group reorganisation flexibility.	Good visual appeal… especially for younger children; good tactile appeal… especially for older children. 'Puff plant' on all red cards difficult to identify.
Overall durability.	Positive, although indicated that if several cards were lost that could jeopardise the whole system.	Cards are durable and have considerable visual appeal. Pictures preferable to letters, numbers, symbols, etc… can be adapted to class themes.	Positive regarding durability but some concern about cards being lost or mixed up -> more work to reorder.
Value of accompanying materials (chart, CD).	Responses were neutral, indicating that extra materials were not advantageous.	The chart was confusing without the provision of further explanation. CD not useful.	The chart is a replication of the card. CD is not useful.
Advantages over currently used grouping methods.	Teachers were generally neutral, not perceiving the cards to be preferable over traditional methods.	Basically, a variation on methods currently being employed, however, children were more cooperative.	Nil, too time consuming. What's to be done about odd numbers?? e.g. 22 children in groups of 3?

Intention to continue use after trial period.	Not intending to use again after the trial.	The availability of too many cards can lead to confusion.	Not indicated. One teacher had fewer than 20 students.
Cost of the resource.	About $10-20 would be an appropriate price.	About $15-40.	About $25-50.

Table 2
Summary of Findings by Categories: Primary School Students

Category	Government School	Catholic School	Independent School
Receptivity to being placed into groups via the cards.	Some three quarters of the children responded favourably.	Students were favourably disposed to being grouped via the cards. Cards easy to use.	"The cards are fun and make the day more interesting".
Appeal of the pictures on the cards.	Some two thirds of the children appreciated the pictures. Most favourable response in junior classes. Children in older classes wanted different pictures (e.g. football players).	Some 90% of the students found the cards appealing. Some suggested making the pictures "more like kids' toys".	Cards "looked awesome" and "pretty cool". Children clearly appreciated the visual appeal of the cards.
Preference for working in groups.	About a third of the students preferred to remain in the same group.	Some 90% indicated that they enjoyed working in groups.	Not indicated.
Preference for continuing working with *Mixintools*.	The vast majority were in favour with the youngest children showing the greatest enthusiasm.	Some 75% were in favour, with the youngest children showing the greatest enthusiasm.	About half of the children indicated that were not all that useful in the classroom.

Table 3
Summary of Findings by Categories: BEd (Primary) Final Year Students

Category	Comments
Positive Aspects	1. Cards visually appealing. 2. Novelty will (initially at least) engage children. 3. Cards remind teachers of the importance of children changing groups. 4. Creates physical movement around the room. 5. The use of red cards as group leaders allows the teacher greater control. 6. Reduces the social isolation that students can feel when groups are formed. 7. Resource is non-consumable - can be used over and over again. 8. Can accommodate different sized groups. 9. Helps to teach social etiquette and group work skills. 10. In fluid groups, students are far more likely to be exposed to a range of differing ideas and thoughts than in self-chosen or friendship-based groups 11. We were forced to think about grouping in new and different ways.
Pedagogy	1. Cards must not be allowed to overshadow lesson content. 2. Group processes are more important than group formation. 3. Cards more relevant to younger than older children. 4. Students can exchange cards and so create confusion. 5. It is noisy as groups are formed, with picture names being called out - could impact on nearby classes and groups. 6. Natural leaders will rise above the construction of artificial groups and may be frustrated by inefficient leadership.
Resource Problems	1. Does not cater for classes with fewer than 20 children, which many today have. 2. Spiders are incorrectly classified as insects. 3. Children will have trouble identifying the 'puff plant' on the red cards. 4. System problematic when working with odd numbers. 5. Instruction are insufficiently clear. 6. Cost at $99 is prohibitive. Resource over-priced in terms of market value.
Recommendations	1. Address the concerns expressed in the above section. 2. Excellent resource for teacher education classes where students are being taught the principles of group formation. 3. Might have greater value for groups such as scouts, YMCA, church groups.

Conclusion

Teachers and teacher education students seem to agree that although *Mixintools* has strengths, it has no compelling advantages over other methods currently employed by teachers. Further, it was noted that vagueness of instructions and anomalies within the cards themselves caused the sort of frustration which discouraged usage beyond the trial phase. The resource may have greater appeal if these concerns were rectified and the cost was reduced.

An interesting aspect which surfaced is the notion that those who participated in the trial simply did not think about grouping in the way the cards were forcing them to think. This might be attributed to the fact that the creator of the resource is a mathematician rather than an educator. This is suggestive of a clash of perceptual paradigms. For this reason, for all of their clever mathematical design and aesthetic appeal, their use in an education setting may be limited. Teachers tend to utilise faster and more convenient methods for the purpose of placing children into groups. Children generally seemed to like using the cards, but without convincing the teachers of their efficacy, the resource is unlikely to make a major impact in the school marketplace.

Having said that, teacher education students felt that the resource did have merit as an exemplar of a grouping strategy. In fact, the resource did heighten their awareness of the need for thinking about group formation in advance of actually placing students into groups. The general conclusion was, however, that once that had been achieved, other less expensive and easier methods could be used to achieve the desired group formation result.

Mixintools is innovative, aesthetically appealing and can serve its stated purpose. Further refinement of the resource may lead to greater marketplace receptivity.

.

.

REFERENCES

Aronson, E., & Patnoe, S. (1997). *Cooperation in the classroom: The jigsaw method.* New York: Longman.

Bennett, B., & Rolheiser, C. (2006). *Beyond Monet.* Toronto: Bookation.

Brady, L. (2006). *Collaborative learning in action.* Frenchs Forest, N.S.W.: Pearson, Prentice Hall.

Cooper, C., & Edwards, C. (1997). *Collaborative learning: Two brains thinking* [video recording]. Perth: Primary Curriculum & Teaching Team, Catholic Education Office of W.A.

Good, T., & Brophy, J. (1978). *Looking in classrooms*. New York: Harper & Row.

Johnston, R. (2008). *The cooperative learning centre.* Interview transcript retrieved 30th May 2008 from http://www.co-operation.org/pages/qanda.html

Luria, A. R. (1987). *The mind of a mnemonist: A little book about a vast memory* [translated from the Russian by Lynn Solotaroff]. Cambridge, Massachusetts: Harvard University Press.

O'Neil, P. (2007). *Mixintools*. Retrieved 28th May 2008 from http://www.Mixintools.com/

Schmuck, R., & Schmuck, P. (1975). *Group processes in the classroom.* Dubuque, Iowa: W. C. Brown.

Vygotsky, L. (1978). *Mind in society: The development of higher psychological processes.* Cambridge, Massachusetts: Harvard University Press.

Vygotsky, L. (1962/1934). *Thought and language.* Cambridge: MIT Press & Wiley.