Making Sense of Teacher Participants' Graphic Organizers in a Second Order Action Research: Reflection of the Voice of an Action Researcher

Chuah Kim Hwa

Teacher Education Institute Batu Lintang Campus,

Kuching, Sarawak, Malaysia

Being a facilitator of AR (action research) to a group of secondary school teachers in Kuching, Sarawak provided me the opportunity to engage in a second order inquiry using AR on the two years' AR learning workshops concerned. The teacher participants were asked to illustrate, using suitable GOs (graphic organizers), their understanding of what they have learned about AR after each workshop. Workshop evaluation forms, reflective learning notes, and research proposals/reports were also used during interviews. The purpose of this paper is not to share the findings of this second order AR. It is also not to assess the teacher participants' understanding of AR but to provide insight into how they constructed their GOs and made sense of their illustrations. Even though teacher participants in this second order AR produced GOs after every workshop, this paper focuses only on the teacher participants' GOs related to stages/phases in AR and two teacher participants' GOs are provided as examples here. GOs were used during interviews in the second order AR to assist the teacher participants recall and elaborate what they have learned during the AR learning workshops. GOs and interview transcripts were then analyzed for themes. Checking of data was also carried out through member checking. Data obtained suggested that the teacher participants used related AR concepts taught in their GOs and were able to describe the underlying structure of their GOs during interviews. They were also able to relate AR concepts used in their GOs to their respective prior learning of AR and their own teaching and learning experiences during interviews. These findings also provided me valuable insight and different perspectives on how the teacher participants constructed and made sense of AR stages/phases from their own perspectives.

Keywords: GOs (graphic organizers), teacher participants' GOs, interview, second order action research, AR (action research) stages, teacher participants, participants' understanding, making sense of participants' GOs

The Context

Being a facilitator of AR (action research) to a group of secondary school teachers at SMKA (Sekolah Menengah Kebangsaan A) (pseudonym), Kuching, Sarawak provided the author the opportunity to engage in a second order inquiry using AR (SOAR) on the two years AR learning workshops concefrned. I have been a teacher educator in the teacher education institute (previously known as a teacher training college) since 1994 and have been involved in AR since 1995/1996. I have collaborated with SMKA in establishing the AR

Chuah Kim Hwa, Head of R & D Department, Teacher Education Institute Batu Lintang Campus.

learning workshops. I have also conducted SOAR inquiry into the AR learning workshops to improve my practices as a facilitator and action researcher other than collecting data for my Ph.D. study. The participants of this SOAR comprised of four willing secondary school teachers from SMKA, but only two teacher participants' GOs are discussed here. Both the teacher participants, Honey and Engle (pseudonyms), taught sixth former classes during the implementation of this SOAR. Honey, in her mid-30s with more than 10 years of teaching experiences at the beginning of this study, has never done any form of research, till she participated in this SOAR. Engle, in her early 40s with 15 years of teaching experiences, is the most experienced researcher among the teacher participants of this SOAR on AR learning. She is also the research coordinator of SMKA.

In this school-based collaborative AR learning workshop, the teacher participants were asked to illustrate, using suitable GOs (graphic organizers), their understanding of what they have learned about AR after each workshop. The teacher participants' generated visual data together with workshop schedules, evaluation forms, reflective learning notes, research proposals and reports were then used during interviews. The purpose of this paper is not to share the findings of this SOAR. It is also not to assess the teacher participants' understanding of AR but to provide insight how they constructed their GOs and made sense of their illustrations through "clarifying action perspectives" (Elliott, 1980, p. 317). Even though teacher participants in this SOAR produced GOs after every workshop, this paper focuses only on the teacher participants' GOs related to stages/phases in AR. Honey and Engle's GOs are provided as examples here.

Why GOs

I should say that I could just assess the participants' answers, but yet again I am sure like most educators, too, and I would not be satisfied with the written answers given. I would like to construct some sense and "gain understanding of the constructions held by people in that context" (Mertens, 1998, p. 161) through clarifying action perspectives (cap). The participants' (insider's) views were sought not through the researcher but the teacher participants' perspectives by focusing on how individuals create and understand their own "space" and AR experiences. In this SOAR, cap was made possible with teacher participants' GOs during interviews.

Developing the usage of the participants' generated GOs as representations and gathering feedback from participants could be traced back to my earlier AR studies (Chuah, 1998; 2000). The 1998 case study found the usage of 10 pre-service teacher participants' self-generated GOs assisted them in understanding the processes in classroom situation(s)/practice(s) and their relations to research processes or other planning and problem-solving activities. The six in-service teachers in the 2000 case study were able to relate their GOs on stages in AR within a cycle with their teaching and learning experiences.

GOs used initially could be traced among others, to previous writings related to the construction of meaning through association of knowledge and new concepts within the individual existing framework (Pearsall, Skipper, & Mintzes, 1997); active participation of individuals in activating and encouraging the transformation, recalling and motivating individuals to learn (Anderson, 1997); and the importance of using pictures (graphics, such as charts, are diagrams that are examples of arbitrary pictures) to assist adult recall learning experiences (Alesandrini, 1984).

Crilly, Blackwell, and Clarkson (2006, p. 341) in their study found the researchers' generated diagrams to be "… effective instruments of thought and a valuable tool in conveying those thoughts to others. As such, they can be usefully employed as representations of a research domain and act as stimulus materials in interviews… ". I went through the experiences in the process of graphic elicitation as depicted by Crilly,

Blackwell, and Clarkson based on both of my previous studies, but the experiences were evoked through the participants' self-generated visual data in the form of GOs.

The findings from both my studies convinced me of the potentials of participants' GOs to be used in interviews that could provide valuable insight and different perspectives on how the teacher participants construct and make sense of AR stages from their own perspectives and context. Thus, I decided to make sense of the teacher participants' understanding of AR in this SOAR by focusing on how individuals create and understand their own "space" and AR learning experiences through their self-generated GOs. Furthermore, the approach of using similar action (in this case, the use of GOs in cap during interviews) in different situations is found to be applicable in this SOAR. I have has then named this approach as Type C approach in looking for focus on AR (Chuah, 2006).

AR questions were posed to the teacher participants after every phase in both cycles of the AR learning workshops and the related AR question for this paper was "illustrated by using suitable graphic organizers the stages/phases in AR. You may use an example of a teaching and learning situation in your classroom to illustrate them". They then generated their own GOs.

How Did I Collect and Analyzed the Data?

Participants' GOs were then used during cap in SOAR interviews to assist them in recalling and elaborating what they have learned. I asked them the reason why they illustrated their answers as such during cap. The interviews were conducted individually with the help of audio recording which I later transcribed. I also used field notes during observation and interviews with the participants by noting important observations and key words used and mentioned during the interviews. There is no particular format used except for writing the dates, time and important observational notes to enable a free form of notes written in accordance to incidents or activities related to this SOAR.

The GOs and interview transcripts were then categorized (Hitchcock & Hughes, 1995) and analyzed. Content and pattern analysis of the GOs were carried out to obtain codes which later formed categories and themes, such as types of GOs, direction of arrows, AR concepts used other than similarities and differences in GOs. Interview transcripts were similarly analyzed and additional categories and themes related to prior learning of AR and teaching and learning experiences were obtained.

I repeated and at time paraphrased some questions and statements during interviews to "confirm" the data. I even showed the transcribed interviews and their GOs to the participants for amendment purposes for "credibility" (Janesick, 1994) or "confirmability" to avoid what Guba and Lincoln (1989; as cited in Mertens, 1998, p. 299) described as "the figments of the researchers imagination". The similar member checking procedures were carried out after the author analyzed and interpreted the data. The findings and discussion in making sense of the teacher participants' GOs in this paper are presented as reflection in the next section.

Reflection: Making Sense of Teacher Participants' GOs

Among the findings suggested upon data analysis of this SOAR are that the teacher participants used related AR concepts taught in their GOs and were able to describe the underlying structure of their GOs during interviews. They were also able to relate AR concepts used in their GOs to their respective prior learning of AR and their own teaching and learning experiences during interviews.

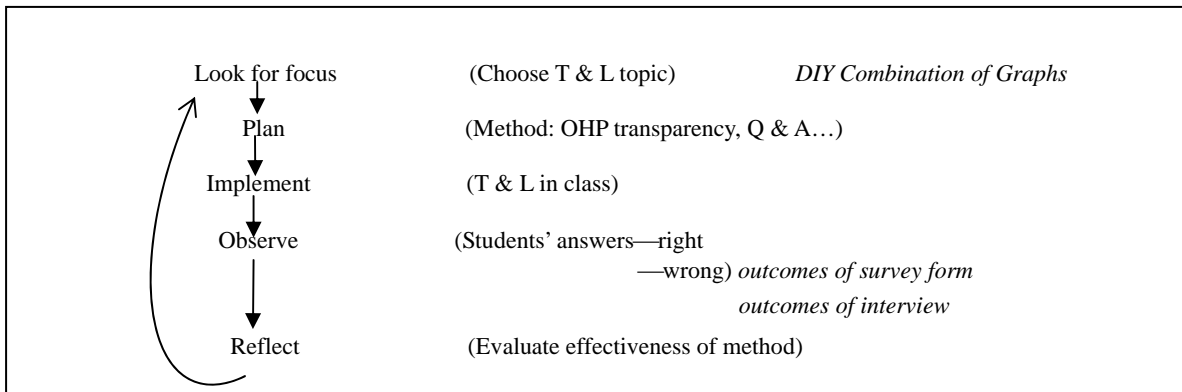Honey and Engle's illustration of the stages in AR for C1P1 (Cycle 1 Phase 1) are shown in Figures 1 and 2.

Look for focus   (Choose T & L topic)   *DIY Combination of Graphs*

Plan   (Method: OHP transparency, Q & A…)

Implement   (T & L in class)

Observe   (Students' answers—right

—wrong) *outcomes of survey form*

outcomes of interview

Reflect   (Evaluate effectiveness of method)

Figure 1. Honey's C1P1 GO on AR stages.

Identify problem/ fokus (sic)

Planning

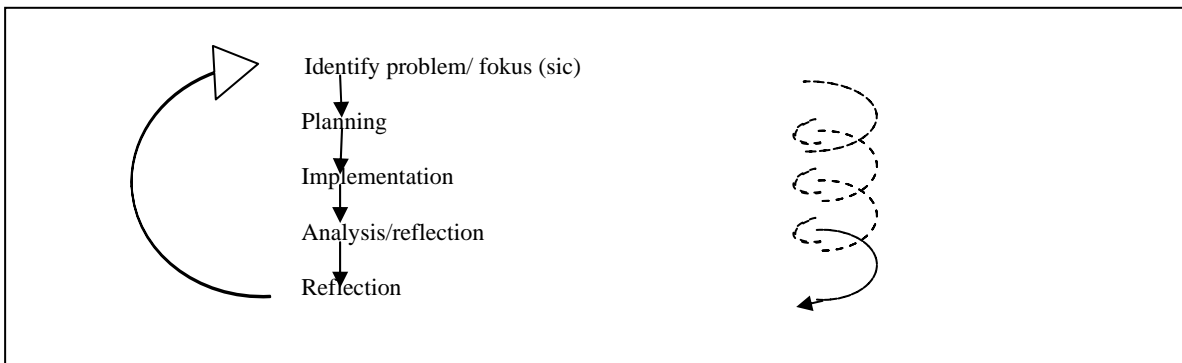Implementation

Analysis/reflection

Reflection

Figure 2. Engle's C1P1 GO on AR stages.

Figures 1 and 2 show that Honey and Engle are able to illustrate GOs and construct the stages in AR respectively. Upon comparing their GOs with the GOs that I have has used in my notes as shown in Figure 3, it is suggested that both Honey and Engle used related AR concepts taught during C1P1 AR learning workshops in their GOs and reconstructed their GOs.
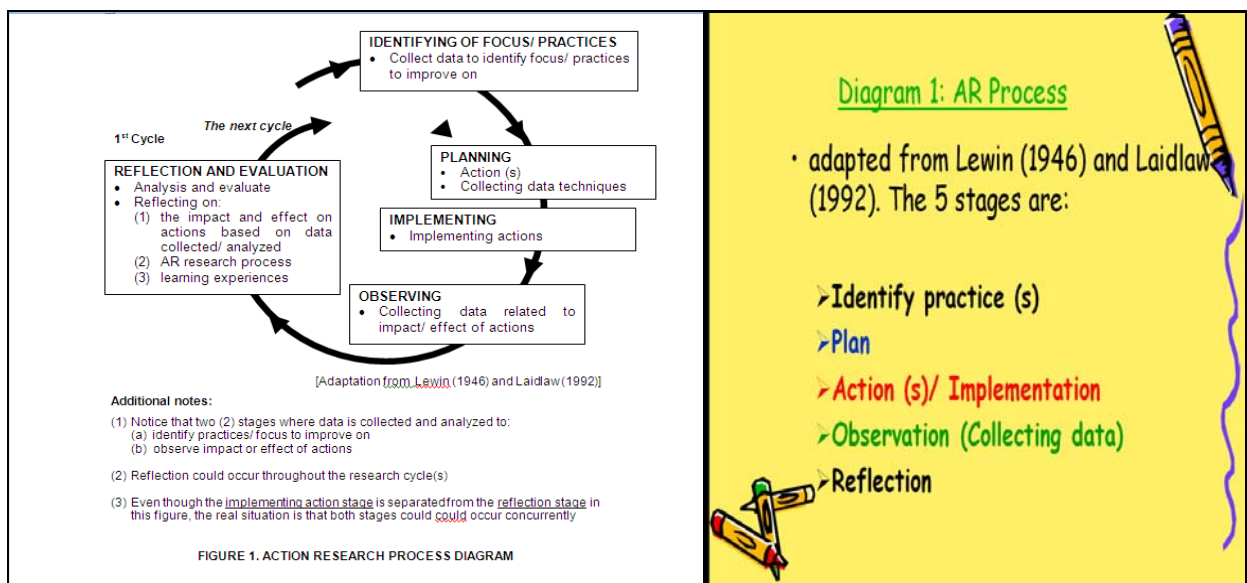

Figure 3. My C1P1 AR learning workshop notes.

I related AR stages in the PowerPoint slides and one of the handouts to assist in linking problem-solving activity with stages in AR during reflective discussion of one of the activities in C1P1 of this SOAR. I would say that here "knowledge is constructed by learners" (Iran-Nejad, 1993, p. 16; as cited in Chuah, 1997, p. 44). I adhered to Vygotsky's theory (Wheatley, 1991, p. 10) that is of opinion that perceived knowledge as not being received passively but actively constructed by receiver within the zone of proximal development through scaffolding. Lasley and Matczynski (1996, p. 318) were of opinion that:

> Regardless of role, the external ideas emerge as another perspective for understanding the ecology of a classroom. External ideas do not constitute truth, they are, instead, representations from significant others who help teachers think in new ways about old problems…

The interview transcripts among Honey (H), Engle (E) and I in relation to the AR concepts used in their GOs are shown as following:

> H: Look for focus, planning, implement, observe and reflection!
> I: Any changes or not? Can you read out!
> H: Choose topic, plan, choose method—transparency, OHP (Overhead Projector), question and answer, implement teaching and learning in class, observe—answers from students—right or wrong, and then reflect—evaluate effectiveness of method and then start the cycle again!
> I: Do you want to amend this illustration about the stages in AR?
> H: Implement, observe—this one, the answer (referring to the students' answer) from student …
> I: Do you want to amend?
> H: … besides wrong, right, ask them from their… can I put in, such as interview, the outcomes…?
> I: Yes, you may!
> H: … outcomes of survey form and outcomes of interview.
> I: Does that mean right, wrong—one of the criteria not necessary?
> H: Still need!
> I: Outcomes like other findings?
> H: Yes!
> (C1P1/interview Honey, pp. 16-17)

From the interview with Honey, it was found that she used AR concepts related to stages, such as "looking for focus, planning, implement, observe and reflection". From my interview with Engle, she used "identify problem, focus, plan, and implemented what the author planned, analysis and reflection".

> I: So in this case, if you look at this—identify problem, focus, what do you mean?
> E: That means you have to focus, because every AR, I think we have to focus on one particular thing or on one particular situation that you want to, or one particular sub topic or one particular that you want to do your AR.
> I: And in this case, what do you focus on?
> E: My last year!
> I: Could you give an example!
> E: Last year, I focused on…, because I have innovation, so I focus on that innovation to see how effective it is!
> I: Is it related to your teaching and learning?
> E: Yes! It's my innovation—Organic Chemistry!
> I: Is it a problem—these students in that area?
> E: I would say yes. It is a problem, because I can see that—that is the basic knowledge they need to know and then if students do not, not able to acquire the skills, they are going to have problems to follow. So, a lot of students actually having problem with that basic skill.
> I: So, over here, you were talking in terms of the students having the basic skills, identify…?
> E: Yes, basic skills in writing molecular formula!

I: So you relate it to your practice?

E: Yes!

I: Then, that is how you start to plan, is it?

E: Yes!

I: What did you plan over here?

E: I plan, of course, I know the focus already. So, now I plan how I am going to improve on that. So, I came out with a game called Organic Fun for Chemistry Form Six!

I: Other than that, what else did you plan?

E: Then, at first, I planned how to carry out data collection, how many will do the data collection, who are my focus group, how do I carry it out, and when to do it, where to do it!

I: Then, later on you implement it?

E: I implemented what I planned.

I: How long does it take for you to implement it?

E: If I talk about that particular AR itself, it was two sessions in one afternoon or one session for the game itself—the certain plan where I did audio recording and all and observation. Another session was interview. I interviewed a few of the students.

I: Okay! So the latter part?

E: Analysis!

I: Analysis—what do mean by that?

E: I transcribed the interview, because the audio recording, I did the transcription, I wrote down observation notes, analyzed it and then I also analyzed it, because the students had response survey! I did a simple survey. Then, I analyzed the data figure, the response.

I: And then, followed by…

E: … reflection! So, the reflection part would be like from the analysis. Then, I will see how effective it is. So, for my conclusion, from the students' responses, they show me that it is positive. So, probably, I will start a second one this year, again—another batch of students, with different students. Every batch they are doing the same problems!

I: So you want to try out again?

E: I think I will try out every year!

I: To get data…

E: … but whether I am going to do AR on it is another matter, another story!

(C1P1/interview Engle, pp. 1-3)

From the interview transcripts, Engle was able to elaborate what she meant by the AR concepts used in her GOs and used example of her AR and situation in her class. Furthermore, a more experienced researcher used the term "cyclic" during the interviews and drew the AR spirals in her GOs to explain what she meant. She then explained what she meant by cyclic, that is "a continuous process" and that the GOs constitute "one (cycle)" and "will constitute one of the spirals and then you go on. It is continuous".

E: I think it is a cyclic, right? So unless if I want to improve, I will add another arrow here!

I: You want to… (took another copy of her answer when I noticed she was about to write on the answer that I showed her)… you have another copy to rectify (I laughed)

E: Like that (after she added in the arrow in the other copy of the answer)

I: Alright! Why did you put that?

E: Because it is a continuous process. It is cyclic. So it will be like this kind of thing.

I: Like spiral?

E: Yes, spiral.

I: So, this is cycle 1?

E: This is one. I mean this will constitute one of the spirals and then you go on. It is continuous.

(C1P1/interview Engle, pp. 1-3)

These findings supported Wheeldon's (2011, p. 520) study in relation to "providing participants an

opportunity to create user-generated and individual graphic representations of experience" in the form of mind maps, another form of GOs and "When combined with follow-up interviews and rudimentary techniques, such as concept counting, this kind of approach may allow for individual concepts to reappear in multiple stages of data collection". I discovered that both Honey and Engle were able to elaborate further the AR concepts in relation to their teaching and learning and their own AR examples as depicted in the interview transcripts shown earlier.

Honey even wrote her understanding of the concepts by relating them to her own AR example which she wrote on the right hand site of her GOs as shown in Figure 1. She then added in (shown in italic) the title of her topic "DIY (do it yourself) combination of graphs" and "outcomes of survey form, outcomes of interview" in her GOs during interview. In her interview, Honey explained her GOs.

> H: I did combination of graphs—the title!
> I: So the focus?
> H: What are the problems my students always faced?
> I: That is when you looked for your focus?
> H: Yes! And then look for one specific title.
> I: Is that why you say choose teaching and learning title?
> H: Yes!
> I: So what is your teaching and learning title?
> H: My title—DIY combination of graphs! In the beginning, I planned.
> I: What do you mean by plan—over here you wrote…
> H: How to do this DIY.
> I: That is the method?
> H: Yes!
> I: So, this transparency, OHP is as an example?
> H: This one (pointing to the word OHP), actually I did not use the OHP.
> I: But, these are some of the other examples?
> H: Yes!
> I: You mean to say that these are the other examples of technique in your research that you used?
> H: I did not use OHP!
> I: But can it be used?
> H: Yes!
> I: For your research—this 2007 research, you did DIY graph?
> H: Yes!
> I: What else?
> H: And then implement this DIY Combination of Graphs Method in the class as I have planned.
> I: And then?
> H: I get feedback from them about this DIY combination of graphs method. Then, I let them answered this survey form, did the interview, then I marked their exercises also based on the teaching and learning that time and then after I collect all the data, I reflect to see whether this DIY Method is effective. Some of them told me they liked it. What some students said is not real, they want mixed. So I know that they do not want to do DIY Graph all the time!
> I: So what other reflection did you put it other than effectiveness of the method?
> H: Use various methods!
> I: So that is the suggestion for the next cycle?
> H: Different method to make them see their own mistakes!
> I: Do you think you can see clearer from this illustration?
> H: Yes!
> (C1P1/interview Honey, pp. 16-17)

Honey even explained to me upon probing as shown in the transcript that she wrote on the right hand side of her GOs to show examples of the concepts in AR stages. I discovered that she used GOs (even though not exactly the same GOs) in her own class when she teaches and that she learned about GOs during her secondary school days in the 1980s. Her teacher taught her:

> I: So at the side of each like those, like look for focus, you wrote there…
>
> H: This is the example for teaching and learning in class. Look for focus, choose teaching and learning topic and then plan is what method to use, like transparency or question and answer, and then carry out the teaching and learning in the class—implement and then observe answers from students whether the answers are right or wrong. And then reflect is evaluate effectiveness of method.
>
> I: So the one at the side, the right hand side, is more like…?
>
> H: Example!
>
> I: Do you normally use this in your classroom when you teach?
>
> H: Depends on the… you mean the whole thing?
>
> I: The way you draw the graphic organizer—I am not talking about the content!
>
> H: Yes, roughly like this.
>
> I: When you teach your student, you use also in the classroom?
>
> H: Yes!
>
> I: Where do you learn that—if you can recall?
>
> H: During school time.
>
> I: You observed the teacher?
>
> H: The teacher taught.
>
> I: When was that, can you remember?
>
> H: Secondary school.
>
> I: That was in 19…
>
> H: 1980s
>
> I: Those were the days! (Both laughed). So you still use it!
>
> H: Yes.
>
> (C1P1/interview Honey, pp. 1-3)

These findings concurred with Liebenberg's (2009, p. 4) findings and opinion that "When researchers include images that participants themselves have created, an opportunity is established for researchers to literally see what participants are talking about… ". The findings also supported Wheeldon's (2011) study that user-generated representations of experience, such as GOs, allowed researchers to probe further the participants' experiences.

Honey and Engle were able to describe the underlying structure of their GOs during interviews as shown in the following transcripts.

> I: So you draw it this way—what did you write?
>
> H: Look for focus, plan, implement, observe and reflect.
>
> I: So for each you draw an arrow down, right?
>
> H: Yes.
>
> I: And then, until reflect, you…
>
> H: Go back to look for focus!
>
> I: Okay! Can I ask you why did you put in this illustration?
>
> H: I put the first on top, and then look for focus, and then the next step—plan, is like going down, moving down to the end. The last one—reflect and if anything that needs to change, then next time can go back to the first—the top one.
>
> I: Why did you draw like this—your reasons for drawing?
>
> H: Easier to understand.

I: The arrows, does it mean anything to you?

H: Yes!

I: The arrows going down from looking for focus on planning*?*

H: Sequence!

I: That is the sequence?

H: Yes!

I: Why did you put looking for focus on the top?

H: First thing need to do.

I: Do you always draw like this in others too?

H: Usually.

I: Usually—start from the top?

H: Yes!

I: Is there a possibility that if I put looking for focus at the bottom?

H: Then, the arrow has to go up!

I: So it can be done that way?

H: Can.

I: But for you, you are more use to writing from the top!

H: Yes!

I: So at the side of each like those, like look for focus, you wrote there…

H: This is the example for teaching and learning in class. Look for focus, choose teaching and learning topic and then plan is what method to use, like transparency or question and answer, and then carry out the teaching and learning in the class implement and then observe answers from students whether the answers are right or wrong. And then reflect is evaluate effectiveness of method.

I: So the one at the side, the right hand side, is more like…?

H: Example!

(C1P1/interview Honey, pp. 1-3)

For Honey, she "draw an arrow down" until the concept "reflect" and "go back to look for focus". She mentioned that "I put the first on top… The last one reflects and if anything that needs to change, then next time can go back to the first—the top one" with arrows pointing down that refer to "sequence" and it is "easier to understand". She placed "looking for focus" on the top, because it is the "first thing (that she) needs to do". Anyway, if "looking for focus" is placed at the bottom, "the arrow has to go up".

As for Engle, she placed her GOs in "stages" and that she placed "identify problem/focus (sic)" at the top, because it is the "first thing you do". She mentioned it could be due to "her training from… quantitative research… first thing, identify your problem" and "think that science is always like that" as shown in the interview transcript.

E: Yes, these are the stages. Because you asked for the stages, okay! (Engle sound irritated and started to use red pen to write on her answer for phase one and I have to stop her by holding on to her pen. Engle smiled and put down her pen immediately when she realized why I did that—that is, not to write on the data).

I: But why in this kind of format? Why you choose this kind of format? (I realized Engle does not understand my question).

E: You say you want it in graphic organizer! (Engle pointed the end of the pen at the instruction referring to illustration in GO)(I began to change the way I asked the question, when I realized Engle did not understand what I meant).

I: But then, on the other hand, I could have just start from the bottom but why you start from the top? (There was a sudden pause, when Engle realized what I was asking).

E: Oh! (Engle gave me a strange look and I started to laugh) To me, (with a smile), to me, to me, ah!... because I think you have to start with your focus.

I: Meaning here you place it at the top…
E: Yes, yes…
I: Like placing it at the top is the most important thing, is it?
E: Yes! This is the thing you do.
I: Oh! That is why you place it at the top?
E: Yes! But later on you see, uh! I add another arrow saying that it could be from the reflection, and then I start…
I: I am not questioning your answer…
E: Yes!
I: … but I am just curious why you start from the top and not from the bottom?
E: I suppose this is my training from my, ah, qualitative… no, quantitative.
I: Your maths, ah?
E: No, quantitative research. First thing identify your problems (Engle laughed).
I: So write on top?
E: Yes!
I: So, you put it on top!
E: That is the first thing you do!
I: First thing means on top…
E: Yes!
I: … not first thing from the bottom?
E: This is how we do it. I think science is always like that (Engle started to laugh).
(C1P1/interview Engle, pp. 1-2)

The findings of both Honey and Engle's explanation on the reason why they placed "looking for focus" on top differed from Prosser and Loxley (2008) who explained the tendency of concept maps that "are based on connections between concepts and tend to be represented in a top-down format with key concepts placed at the top and lesser concepts positioned lower down on a page" (p. 25). For Honey and Engle, "looking for focus" in one of the AR concepts related to stages is placed on top as it is "the first thing you do".

Further Reflection

Data obtained for this C1P1 SOAR suggested that the teacher participants illustrated their GOs based on the AR concepts they have learned in the AR learning workshops. They were also able to relate the AR concepts used in their GOs to their respective prior learning of AR; their own experiences in teaching and learning (as a student and teacher) and even in their own AR examples and experiences to illustrate and explain their GOs during cap in interviews. These findings on GOs concurred with Wheeldon's (2011) study about mind maps who is of opinion that mind maps when combined with follow-up interviews would lead to "… increase in concepts identified by participants in subsequent data collection and resulted in an increased willingness among participants to provide summative and reflective responses based on their own unique experiences" (p. 520). That means participants would provide more examples based on their experiences in explaining and connecting the different concepts which I found in this C1P1 SOAR.

These findings also provided me valuable insight and different perspectives on how the teacher participants construct, make sense of AR stages from their own perspectives and describe the underlying structure of their GOs during interviews. The teacher participants cited their various experiences and existing knowledge as their focus on their answers and illustration. These "multiple realities that exist are time and context dependent" (Mertens, 1998, p. 161) shaped by our understanding and perception of reality. "Our realities as our understandings are transient and inconsistent. It is useful to try to merge our experience into a

common and reliable reality, but it is also useful to hang onto disparate perceptions, some of which open windows to deeper realization" (Stake & Mabry, 1995, pp. 298-210). The power of participants' self-generated GOs as graphic elicitation during interviews could be explored further in understanding construction of AR concepts in context in future AR learning.

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