Introducing ARC (ask, record and confirm) as the new validating technique in real-time

Mohd Zairul1
1Department of Architecture, Faculty of Design and Architecture, Universiti Putra Malaysia, Serdang, Selangor, Malaysia
Email: m_zairul@upm.edu.my

Abstract. The ARC technique (ask, record and confirm) is introduced to perform validation and member verification procedures for focus-group data in real-time. During the focus-group sessions, response keywords were initially recorded on Post-it notes and were then pasted as a category onto an A1-sized sheet of paper. To illustrate the nature of the ARC technique, several steps were taken during the focus group and post-focus groups using this method to gauge feedback on the proposed business model (BM) of affordable housing. Next, the retrieved information was transferred into ATLAS.ti 7 for coding analysis and to generate meaning from the transcription. This paper is concluded with a discussion concerning the advantages and disadvantages of using the ARC technique for future studies.

1. Introduction
Typically, focus groups are linked with interactions or discussions that involve a group of respondents and mediators [1], [2]. Focus groups have become a popular means of exploring novel ideas, gathering opinions from a collaborative group, restructuring one’s view towards issues discussed, and interpreting culture (Gibbs, 1996; Kidd & Parshall, 2000; [3]; [4]. Nevertheless, what is missing from this method is validation of focus-group session data in real-time. As such, this article addresses this issue by discussing the weaknesses of validation strategies in the conventional focus-group strategies and by providing empirical evidence on conducting validation of focus groups using the ARC technique, in order to gain feedback for the proposed business model (BM) meant for affordable housing in Malaysia.

In increasing the validity of focus groups, the ARC technique is recommended, especially to clarify member verification procedures. Employing ARC in member verification allows the confirmation of discussion topics in real-time. Upon reaching end of the session, issues at hand, new ideas, and discussion summary are tentatively re-visited based on those written on Post-it notes for further clarification and validation. Additionally, the findings are summarised, and debriefing session is performed via snowballing techniques to assess strong opinions and ideas, as well as to determine areas for enhancement for the following sessions. The ARC technique assists inexperienced facilitators clarify important points that they may have missed during the session at the confirmation stage.

The next section elaborates the methodology and the sampling employed for the general research. The triangulation method ensures that the data sources do not cause conflict and that the moderator’s interpretation is validated in real-time during the confirmation stage. The techniques applied in one of the focus groups are elaborated in this section. Finally, this article is summarised by presenting the advantages and the drawbacks of using this technique.
2. Research Methodology
This study employed the triangulation approach by incorporating case studies, a design workshop for architects, and data gathered from the focus group sessions [5]. Besides, the triangulation approach was embedded in this study to enhance data reliability [6, 7]. The focus in this article lies on the validation of the focus group sessions using the ARC technique. In the ARC technique, data gathered in the preliminary round were presented to the respondents in order to evaluate their responses and to make changes if required. Most importantly, the snowballing technique fed the outcomes from a session into other sessions to gain more information. As such, more questions were posed, and outputs opined from prior session were further discussed in upcoming sessions.

Initially, the Malaysians students in Netherlands became the pilot respondents. The following focus group sessions were carried out in Malaysia by incorporating three groups of respondents from varied backgrounds. The emphasis of three focus group sessions with young starters had been on the selection of financial and design flexibility. Meanwhile, the topics discussed in focus groups 2 (entrepreneurs and private developers) and 3 (government agencies) were related to finance and supply chain. In particular, the focus group topics matched the expertise and the interests amongst the respondents [8]. The idea of having varies sampling for the study is to get in-depth responses on the new concept and to investigate deeper on the feedback from the different sampling.

Group 1: young starters (Malaysians aged between 25 and 34 years old)
(1 session of pilot study and 3 focus-group sessions held in Malaysia)
Group 2: private developers, entrepreneurs, and NGOs addressing housing
(1 session)
Group 3: government agencies addressing housing, i.e., PR1MA and KPKT (1 session)

2.1 Group 1 (young starters)
A pilot session and three focus group sessions were conducted amongst the young starters to gain their opinion regarding the proposed BM, particularly about the services and goods offered. A feedback analysis was performed to determine if the proposed BM i) addressed the aspect of flexibility in the present housing choice, ii) addressed the financial issues experienced by young starts, and iii) served as an alternative to the present housing model within the industry.

Additionally, controls had been applied to gather the demographic profiles of the respondents (age, occupation, income, and residence) to comprehend how the respondents addressed the questions posed, mainly because comprehension of the BM was dictated by their demographic factors. A set of criteria that was developed to select the focus group respondents is as follows: 1) young professionals aged between 23 and 30; 2) household income (joint income) below RM 6000; 3) presently renting and residing at the city or staying with parent(s); and 4) have considered housing ownership or have been rejected by bank or other financial institution.

In the second session, the young starters refined the questions for the following focus group sessions. This allowed the researcher to examine the responses obtained from the prior session to ascertain their comprehension and acceptance towards the proposed BM. In fact, the focus group sessions were repeated by embedding the snowballing technique so that the retrieved findings could enhance the proposed BM. Both oral and written feedbacks gathered from the initial session were used to add, delete, and improve on the topics for the following sessions.

2.2 Group 2 (private developers, entrepreneurs, and NGOs addressing housing)
The sampling technique applied for focus group 2 differed from that employed for focus group 1. The respondents for focus group 2 consisted of private developers and active entrepreneurs of the Malaysian housing domain and were selected via purposive sampling. This cluster of respondents was chosen as they represent the housing industry. The topic introduced to this group was finance and supply chain.

2.3 Group 3 (government agencies)
Focus group 3 involved government agencies that looked into matters related to housing in Malaysia. The topic discussed in this group was legal and financial matters. The improved BM, after
incorporating feedbacks retrieved from focus groups 1 and 2, was revised with the respondents from focus group 3. These government agencies drew a bridge between the entrepreneurs and the young starters.

3. Methods Procedure
The housing affordability rates for young individuals appear to be a concern, hence the need for customisation to meet present and future requirements concerning quality-related issues that affect the current conventional housing stock. Focus group interview was performed to explore the effectiveness of the proposed BM. The focus groups involved three sessions held with young individuals, as well as sessions with private housing developers, housing entrepreneurs, NGO representatives, academicians, and representatives of government-associated business arrangements with housing. This study heavily relied on focus groups to develop understanding towards the BM structure, including service proposition offers by companies (design), affordability rates for the target group (financial), and means of improving the quality of housing through industrialised production (supply chain). The research began with three priori codes (design, financial, and supply chain). The sessions revealed several inductive codes, which sparked a debate in the discussion chapter in the thesis.

The focus group approach was performed to refine a draft BM into a final BM that can accommodate Malaysia’s mass housing industry. Based on the findings, the final BM considered implementation gaps discovered in the Malaysian context, as well as interpretations of the choices and reasons behind the feedbacks provided. In exploring new ideas for a new BM, several methodological challenges were faced due to difficulty in expressing knowledge and the non-standard practice amongst the respondents. The protocol for the focus group implemented a 20-minute presentation regarding the BM, as illustrated in Figure 1. Each respondent was given marker pen and shared an A1 paper with description on BM based on three deductive codes, which were design, financial, and supply chain, that functioned as guideline. The proposed BM was printed for the respondents to write their opinions and feedbacks. Different coloured Post-it notes were given to the respondents so that each and every member contributed to the discussion [2].

![Figure 1. Presentation of the conceptual business model](image.png)

The discussion was initiated by adhering to the following steps: 1) asking the respondents regarding the associated issues using open-ended questions; 2) recording answers given by the respondents, as well as requesting them to jot down comments and reflections on the Post-it notes to be placed later at the right side of the A1 paper; 3) confirming twice the ideas, discussions, codes, and responses. A second moderator was included to determine the verbal and non-verbal aspects for further analysis and to transcribe the gathered data in the next stage. It was predicted that the respondents might offer extra information regarding the BM as they were asked to narrate their experiences associated to housing ownership and the impact of this new BM on the housing industry. The proposed BM was introduced during the presentation stage to elaborate how housing manufacturers increasingly retain ownership over housing components when there was a chance to do so. These manufacturers served as service providers, instead of selling consumption products, assisting in progression of better ‘return policies’, and generating durable products to facilitate disassembly, re-use, re-distribution, refurbishment, and remanufacturing. All focus group sessions were video-
recorded and audio-recorded. The ARC method was applied to ascertain that accurate information was gathered from the focus group respondents via Post-it note intervention. A group debate was allowed to verify the feedback. Additionally, verification of members was performed in real-time to ensure data validity and to hinder misunderstanding.

Upon generating transcripts, several questions served as guideline: 1) Should all topics or only key session issues be transcribed? 2) Should sessions be transcribed verbatim or summarised? and 3) Should observations (silence/audible behaviour) be recorded [9]? Despite the usefulness of complete transcription, it may not solely meet the research goals [10]. As in this study, the Post-it notes facilitated the whole process of transcription by summarising the findings and addressing questions linked to the study. Besides, this step had considered some emerging codes obtained from the focus group approach. As displayed in Figure 2, photos were captured to serve as proof of the study conducted. The outcomes from the transcriptions were transferred into a survey table via Microsoft Excel.

![Figure 2. Transcription process using ATLAS.ti 7](image)

Microsoft Excel was applied to develop the survey form, which embedded the background information to function as the study guideline. As portrayed in Figure 3, the questions asked during the focus group were a blend of single and multiple choices. The respondents were requested to complete the information sheet in the attempt of gathering their background information.

![Figure 3. Survey form created in Microsoft Excel](image)

The survey tables were interpreted differently by using ATLAS.ti. Prefixes were applied to ascertain that the information gathered from the survey fit the document in ATLAS.ti. For instance, prefixes
ending with “!” reflected primary documents, as illustrated in Figure 4 that shows the primary document of each respondent.

![Figure 4. Primary documents in ATLAS.ti 7](image)

Next, the information was used to generate codes, as presented in Figure 5. The information was keyed-in after two colons (::) were attached to the object comment area, which were part of the coding process or resulted in PD families. The network view shows that the correlations of the quotations generated active networks between the quotations and similar codes. This network view enhances understanding regarding the variety of needs linked with major issues, as well as how the respondents discussed and debated about a particular topic.

Table 1 presents a summary of the focus group sessions in a condensed manner to ease readability, especially in comprehending how the posed questions were addressed. The focus group sessions were divided into three broad categories, which were: 1) proposition of design and value, 2) production and supply chain, as well as 3) financial and terms of payment.

The co-occurrence function found in ATLAS.ti was applied to analyse the coding responses frequency, which reflected deductive codes identified earlier. The following figures show that young individuals responded mostly to matters related to finance in conjunction to design. The co-occurrence table illustrated in Figure 6 displays the outcomes of density, as well as a discussion pertaining to issues. The sessions with the government agencies, however, excluded topics associated to design due to lack of relevance and were covered in prior sessions. Discussions on response interpretations, nonetheless, were discussed at length in the discussion chapter of the thesis, as they are excluded from this paper.
Figure 5. Codes drawn from the survey table

Figure 6. ATLAS.ti co-occurrence tool
Table 1. Transcription summary

| PILOT GROUP: Young starters | Coding categories |
|----------------------------|-------------------|
| Design / Flexibility / Products / Services | A = Postgraduate students |
| What type of house, services and product do you need? | B = Undergraduate students |
| | C = Academicians |
| | D = Others |

| Category code | Participant ID | Gender | Responses |
|---------------|---------------|--------|----------|
| A             | 1.1           |        | I want to have easy access to parking |
| A             | 1.2           |        | I want to have access to the lift |
| A             | 1.3           |        | I want my own laundry area |
| A             | 1.4           |        | I want to have good view |
| A             | 1.4           |        | I want my interior to have good lighting and ventilation |
| A             | 1.2           |        | Can I have more accessibility than others (I pay more)? |
| A             | 1.4           |        | My priority is safety |
| A             | 1.3           |        | I want to choose design options from an easy platform (online shopping) |

Supply chain / Time leads / Waiting time / Sustainability / Quality products / Services

How long do you think is the appropriate time for waiting? Is it necessary to have sustainable housing?

| Category code | Participant ID | Gender | Responses |
|---------------|---------------|--------|----------|
| A             | 1.1           |        | 3 months maximum for transition period |
| A             | 1.2           |        | I want to have direct connection with the suppliers |
| A             | 1.3           |        | Easy to order and customize |

Financial / terms of payment / credit? / Loan / Mortgage / Rent to buy options / Incentives

How much can you afford to pay / How do you like to pay?

| Category code | Participant ID | Gender | Responses |
|---------------|---------------|--------|----------|
| A             | 1.4           |        | I can afford only 1/5 of my salary for beginning |
| A             | 1.2           |        | Provide more incentives for loyal customers |
| A             | 1.3           |        | Refurbishments cost? |
| A             | 1.2           |        | Do I need to pay for moving out? |
| A             | 1.4           |        | Resale value? Is it increasing? |
| A             | 1.3           |        | How much are the utility fees? |
| A             | 1.1           |        | Flexi credit with more options to pay |

4. Drawbacks and directions for future research
An important lesson learned from this study is that a researcher’s degree of competence can affect focus-group moderation outcomes. As explained above, the ARC technique facilitated the validation processes and member verification procedures in real-time. However, moderators must develop their skills in facilitating groups and in helping passive members to actively engage in the discussions. Based on the author’s experience, when a focus group is initially conducted, more lines of transcripts are spoken, and groups tend to become more spontaneous and conversational. One solution is to be completely prepared prior to the real sessions, e.g., by conducting several pilot studies in order to gain experience.

Another issue of concern is that the respondents might not be honest in their responses regarding the topic due to the holistic nature of the outputs and agreed upon by all members. The respondents, hence, become cautious with their opinions and thoughts, especially when their thoughts contradict to those uttered by the other group members. Therefore, the aim of conducting focus group is to gain insight and detailed information pertaining to particular ideas and products holistically and not by individual experience, as in the case of face-to-face interview.

Upon examining the methods associated to translating the discussion into keywords, some respondents appeared to be succinct in their expressions. When attempting to summarise the discussed ideas, the moderators seemed to interrupt the discussion and suggest keywords, hence creating biasness and
influencing the final codes. Thus, some degree of distance should be maintained between the respondents and the moderators. Despite the importance of moderator roles during focus group discussions, the respondents have the final responses.

Another issue that emerged refers to homogeneity and heterogeneity of the background of the respondents. Upon sharing similar backgrounds, group dynamics seemed to function better. Nonetheless, those with varying backgrounds generated broader and fascinating views. The pilot study involved focus group amongst Malaysian PhD students at TU Delft. The homogeneity of the respondents contributed to a session that was relaxed and sociable as they appeared to support opinions given by one another, while some sessions went to extended time due to the causal behaviour of the respondents. Respondents from a variety of backgrounds (graduate students, young lecturers, and young professionals) were included in the following sessions and resulted in dominance by a particular group and astounding outcomes. A wider range of issues was discussed, and new codes emerged with the multi-background group. This offered richer data, hence worthwhile exploring.

In one of the sessions, those older and professional respondents requested the moderator to jot down the keywords from them. This required classic goals of rapport, especially when the respondents have established connections prior to the focus group discussion. In this case, it was easier to validate the outcomes and required less time because the moderator was in control of the whole situation. Keywords provided from the previous session, which functioned as indicators on how the opinions were collected, had been discussed in the following sessions, making the sessions more precise and shorter. This is attributed to discussions that disregarded extended elaboration, as the initial focus group. Data saturation was also contributed by pooling of ideas [11]. The primary topic in further exploration of the ARC method is related to the success of sessions with not more than two moderators. While one moderator controls the session, the other looks into keywords that emerge during debates, apart from re-addressing them during member verification session. In fact, the second moderator may further seek clarification about the keywords to prevent misinterpretation. Such clarification may be performed by incorporating feedback via ATLAS.ti 7 video transcriptions. Despite the recording techniques employed, it is crucial for the second moderator to be alert, especially when the discussion turns lively and when several respondents speak at once.

5. Conclusion
When is the ARC technique most likely to be valuable? Based on the author’s experience, this technique is useful when the researcher has insufficient time to send a final transcript to each member for verification. In this study, member verification was required to ascertain that the input was indeed usable within the context of Malaysia, i.e., material costs, standard operating cost for similar activities, appropriate sizing of the prefabrication area, as well as the technical inputs to determine resources and activities linked with the housing industry.

Since this technique appears to be new, new cases of usage would demand more exploration and further improvement. However, at this stage, this technique proved to save time during validation, hence increasing the internal validity of the research findings. As demonstrated by conventional processes of member verification after completing transcription, some respondents are unwilling to validate transcriptions, and logistical issues can arise when respondents are unavailable. Finally, this technique offers data collection triangulation, which involves voice and video recording, direct observations, and ARC techniques. Furthermore, sessions can be completed after all respondents agree on the summaries obtained from the sessions. The snowballing method in the ARC technique may differ from the Delphi method because the information is snowballed to a different group, and not with the same participants, as performed in the Delphi method. Additionally, the ARC technique will help inexperienced facilitators clarify important points that they may have missed during the session at the confirmation stage and avoid disagreement on the data collected after the session. Overall, it is believed that this new technique will benefit focus groups and qualitative researchers.

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