

Figure 3. Exploratory sequential design.
Source: Adapted from Figure 3.2(c): Creswell and Plano Clark (2011: 69).

Data integration in MMR

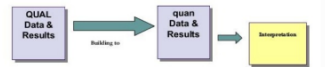
• types of integration:

1. **Merging** the data: quantitative & qualitative results are brought together & compared.
2. **Explaining** the data: qualitative data are used to explain the results of quantitative data.
3. **Building** the data: qualitative findings are used to build quantitative phase of the study.
4. **Embedding** the data: One set of data is used to augment or support the other set of data

Sequential Exploratory Design ('QUAL → quan'):

- Alternatively, we can refer to it as **exploratory design**.
- Viewing the study as a two phase project.
- Used often to **explore** a phenomenon, **identify** themes, and or **design** an instrument.
- In an exploratory design, qualitative data is first collected and analyzed, and themes are used to drive the development of a quantitative instrument to further explore the research problem.
- Typically, greater emphasis is placed on the qualitative data in the study.
- Data analysis is usually connected, and integration usually occurs at the data **interpretation** stage.
- In exploratory studies, where the concepts, variables and relationships among them are mostly unclear, greater priority is often assigned to **qualitative elements** that uncover the 'pool' of variables and relationships among them that may be subsequently studied quantitatively.

Sequential exploratory design



Sequential Exploratory Design- Data collection

- In this strategy, the data collection would occur in 2 phases with the initial qualitative data collection followed by the second quantitative data collection.
- The challenge is how to use the information from the initial phase in the second phase.
- The qualitative data analysis can be used to develop an instrument with good psychometric properties (i.e., validity, reliability).
- The qualitative data analysis will yield quotes, codes, and themes.
- The development of an instrument can proceed by using the quotes to write items for an instrument, the codes to develop variables that group the items, and themes that group the codes into scales.
- A researcher can analyse the qualitative data to develop new variables, that will be explored further in a quantitative phase.
- The question arises if the sample for the qualitative phase is the same for the quantitative phase. This cannot be, because the qualitative sample is typically much smaller than a quantitative sample needed to generalize from a sample to a population.
- Sometimes mixed methods researchers will use entirely different samples for the qualitative and quantitative components of the study.

Sequential Exploratory Design- Data Analysis:

- In this strategy the researcher analyses the two databases **separately** and uses the findings from the initial exploratory database to build into quantitative measures.

Sequential Exploratory Design- Interpretation:

- Researchers interpret the mixed methods results in a discussion section of a study.
- The order of interpretation is to first **report the qualitative** findings, the use of the qualitative results (e.g., the development of an instrument). and then the **quantitative results** of the final phase of the study.

- Examples on Sequential Exploratory Study:

1• A researcher may conduct a focus group of special education teachers to generate discussion of perceived barriers to implementing speech and language services in the schools (QUAL). Then, using the ideas generated in the focus group, a large-scale survey might be sent to all the teachers in a district asking them to rate the impact of predetermined barriers (quan).

2• A study sought to: 1) understand the motivating and inhibiting factors to physical activity and exercise in people after spinal cord injury (SCI), and 2) develop, test and implement a survey tool that examines self reported physical activity after SCI and its relationship with secondary conditions.

- Qualitative (exploratory) data collection preceded the quantitative study component.
- The focus groups specifically explored barriers and facilitators of exercise.

Understanding these factors was critical to inform development of the survey tool, which included items on 'chronic and secondary conditions', 'health risk behaviours', 'hospital and health care utilisation', 'physical functioning', 'exercise activities and patterns', 'rehabilitative therapy', 'wheelchair use', 'community integration'

3• Stoller et al. (2009) conducted a sequential exploratory study to explore factors that affect the decision to curtail alcohol consumption in those with hepatitis C, a previously under-researched topic.

- Interviews were conducted with 42 participants with hepatitis C who had been advised to curtail alcohol. From these interviews, 17 decision factors were identified which then fed into the development of a survey measuring these 17 new factors.
- This survey was then administered to 577 people with hepatitis C, thereby testing these new factors in a larger sample and providing prevalence estimates.

4• Perceived challenges of nurse educators while teaching undergraduate nursing students in Pakistan: An exploratory mixed-methods study

Objectives

To **explore** nurse educators' perspectives about their clinical and academic teaching, to **develop** a questionnaire to determine educators' challenges, and to develop a comprehensive understanding of educators' challenges.

Design

A sequential exploratory mixed-methods study.

4. Methods

4.1. Design

An exploratory sequential design, comprising three phases, was used as it allows exploration of a phenomenon from participants' perspective and to develop an instrument that "based on the culture and setting of the research participants rather than pulled off the shelf for use" (Creswell and Plano-Clark, 2018, p. 84). The initial qualitative phase was used because: a) no instruments existed to determine educators' challenges, therefore the qualitative findings informed questionnaire development and b) teaching challenges are contextual and are influenced by the nature and structure of nursing institutions, hence the qualitative phase helped to capture these contextual challenges.

4.3. Instruments

The qualitative interview guide was developed based on the WHO competencies (Table 1). The primary questions asked participants to describe any challenges in meeting each competency. Acknowledging that some of the participants may not be knowledgeable about these competencies two questions explored their roles and responsibilities as educators.

4.4. Data collection

The data collection took place from January–February 2018 (qualitative phase I), April–May 2018 (pilot phase II), and July–December 2018 (phase III). For the qualitative phase I, the researchers invited educators to participate in the study through the management of the institutions. The interviews were conducted at the time and place that the participants deemed convenient. The researchers gave written information outlining the purpose and estimated timing of the interview, its recording and transcription, and sharing of the data with the team. The participants were encouraged to ask any questions before, during, and after the interview and were reminded of the right to stop the interview anytime. During the interviews, prompts were used to develop in-depth understanding of the challenges. The interviews were initiated with an overarching question and lasted for 20–25 min.

For the phase II quantitative study, five experienced nurse educators were contacted through email and their responses were sought to evaluate the face and content validity of the developed questionnaire. They were provided with a content validity questionnaire entailing detailed information of the study population and setting, the scale items, categories, a 4-point Likert Scale (1=not relevant, 2=somewhat relevant, 3=quite relevant, and 4=highly relevant), and two open ended questions: i) Please comment on any of the items which can be revised and rephrased and ii) Please share your views about why any of the items were rated as not relevant. The purpose of this content validity exercise was to judge the relevance, comprehensiveness, and balance of the scale items (Polit and Yang, 2016). After this exercise, some of the participants from the qualitative phase were invited to assess the readability and clarity of the items to their setting. A linguist and a layperson further assessed the readability because having a neutral perspective can provide more insights concerning the used language. The final judgement of the items was made by the team.

4.2. Sample and setting

The study was conducted in 12 public and private nursing institutions in five cities: Rawalpindi, Islamabad, Lahore, Swat, and Peshawar. The target population (N=180) comprised all nurse educators involved in clinical and classroom teaching. For the qualitative phase, a purposive sample of 12 educators were recruited to ensure greater representation from different subgroups (age, gender, and education level) and five cities. The developed questionnaire was pilot tested with 15 educators from all institutions. The recommended pilot sample is at least 15–30 (Grove et al., 2017). For quantitative surveys, 112 educators from all institutions participated following an open invitation. The sample size calculation was not feasible because of a small population.

Table 1. Qualitative interview guide.

Opening remarks
I would like to thank you for agreeing to share your views about self-awareness and its importance in nursing practice. First of all, please describe your role as a nurse educator?
Questions
1. Please describe your responsibilities as a nurse educator.
2. Please describe the challenges that prevent you from fulfilling these responsibilities.
3. Please describe any challenges that you encounter while applying your theoretical nursing knowledge in teaching nursing students.
4. Please describe any challenges that you encounter while developing course work and implementing it in teaching students.
5. Please describe any challenges that you encounter while teaching nursing practice to students.
6. Please describe any challenges that you encounter while conducting research to inform and improve your ability to teach nursing and to share that research with the nursing community.
7. Please describe any challenges that may prevent you from communicating and collaborating with health care teams and developing a partnership for enhancing nursing students' clinical learning.

4.5. Data analysis

Thematic analysis was used for qualitative analysis: a) data familiarization and transcription which involves reading and re-reading data, b) initial coding which involves coding at different levels, c) theme search which involves collating relevant codes into potential themes, d) theme review which involves developing thematic maps, e) themes defining and naming, and f) theme finalization. Prior to coding, participants' transcripts were read several times to develop a comprehensive understanding of their responses. In this stage, to ensure credibility, the researchers set aside personal thoughts, ideas, and feelings that may prevent them from gaining a thorough understanding of the responses. Data coding were completed at three levels: line by line reading of the individual transcripts and identifying the key messages of each line (level I coding), reading and analyzing level I codes across transcripts and analyzing for similarities, differences, and patterns and then condensing level I codes into broad codes (level II coding), and condensing level II codes into categories (Level III coding) (Braun and Clarke, 2006). Once coding was completed, to ensure credibility, the categories were applied back to the transcripts to examine the data's consistency with the themes.

Regarding mixed method analysis, building and merging integration techniques were used. Building is an integration approach when one dataset informs the data collection approach for the subsequent phase (Fetters et al., 2013). This approach was used in the qualitative phase and the pilot phases in order to develop the survey. Merging refers to the integration of qualitative and quantitative data at the data analysis level (Fetters et al., 2013). This approach was used at the end of the survey when the interviews and the final survey results were compared. The qualitative

For phase III, the quantitative study, a convenient sample was used. An invitation was sent to the nursing institutions through the institutional heads and the educators who agreed to participate contacted the researchers through phone or email. The researchers provided detailed study information to the participants along with a paper based or an electronic questionnaire.

Sequential Transformative Design:

- Has 2 distinct data collection phases.
- Both types of methods are combined in this design, but the research is also explicitly driven by a transformative theoretical perspective.
- In this method **either type of data can be collected first**
- A theoretical perspective (lens) is used to guide the study (transformative framework).
- **Purpose is** to use the methods that will best serve the theoretical perspective of the researcher.
- After separate analysis of qualitative and quantitative data, integration of outcomes will take place during the interpretation phase.

- The researcher uses a theoretical based framework to advance needs of underrepresented or marginalised population (women, people with disabilities, racial and ethnic minorities, religious minorities).

Sequential transformative design



- Seeks **to address issues of social justice and call for change.**
- **Strength:** very **straight-forward** in terms of implementation and reporting.
- **Weakness:** time consuming. **Little guidance due to the relative lack of literature on the transformative nature** of moving from the first phase of data collection to the second.

- An example of Sequential Transformative design:

- A sequential transformative study was conducted to examine the cultural influences on mental health problems.
- The study commenced with a quantitative telephone survey of the community which included the General Health Questionnaire.
- The quantitative phase of the study was followed by qualitative interviews which were theoretically driven. These interviews enabled the researchers to explore the cultural health experiences related to the non-use of mental health facilities by Vietnamese and West Indian participants living in an urban area of Montreal.

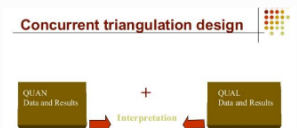
Concurrent Triangulation Design:

- In this case, the **qualitative & quantitative data are collected simultaneously.**
- Priority is usually equal and given to both forms of data.
- The results are then integrated in the final interpretation.
- **Merging** of QUAN and QUAL results occurs during the analysis and interpretation to provide an integrated conclusion and involves comparing, contrasting and synthesising the two strands.
- Used when the researcher wants to validate quantitative findings with qualitative data.
- Particularly useful for decreasing the implementation time.
- **"Parallel"** term can be used to define the concurrent approach
- Data collection priority (equal).
- Sequence (concurrently).
- Use of data (To **compare** similar/dissimilar).

• "Parallel" term can be used to define the concurrent approach (Bryman, 2006).



Parallel triangulation design



- An example on Concurrent Triangulation Design:

- In their study of maternal and child well-being conducted semi structured in-depth interviews with mothers and collected quantitative data using several validated scales (e.g. Parenting Stress Index, Edinburgh Post-Natal Depression Scale (EPDS), Rosenberg Self-Esteem Scale) at the same home visit.
- The authors identified numerous family stressors in interviews, which were corroborated in the quantitative maternal stress index scales. Similarly, the objective measures (EPDS) addressing emotional well-being that indicated a high level of maternal depression were supported by findings from the interviews, in which mothers reported low energy levels, despondency and anxiety attacks.
- The authors note that concurrent use of qualitative and quantitative measures adds to the depth and scope of finding.

Determinants and mitigating factors of the brain drain among Egyptian nurses: a mixed methods study:

Methods: Mixed-methods research was conducted using a concurrent triangulation design. A sample of 325 nurses who were working at an Egyptian university hospital answered a brain drain questionnaire while the qualitative investigation was guided by a semi-structured interview with a purposive sample of 35 nurses to elicit exploratory perspectives on factors causing brain drain and mitigation strategies. Results were analysed using inferential statistics and thematic data analysis.

Methods

Research setting and design

This study was conducted at the Main University Hospital, which is a large university hospital in Alexandria City, Egypt. A mixed-methods research design using 'concurrent triangulation' was conducted in this study, in which both quantitative and qualitative data were simultaneously collected to determine convergences, differences and combinations among them, develop a comprehensive understanding of the research phenomena, and more precisely establish relationships among variables of interest (Creswell et al., 2003; Sharon and Hakomb, 2009). A quantitative study was carried out with a cross-sectional design while the qualitative investigation was guided by semi-structured interviews to elicit more insight of nurses' personal experiences and understanding of potential factors to migrate causing brain drains and how to manage these. The findings from the qualitative descriptive part may be of special relevance to practitioners and leaders in developing strategies to address workplace issues that increase nurses' retention.

Study participants

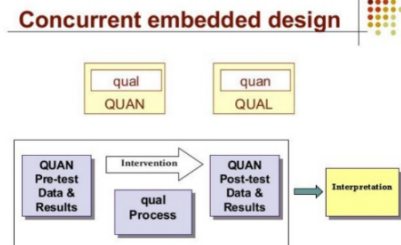
The total population of nurses working at the above-mentioned hospital is 600 nurses. All nurses with experience of one year and more were eligible for the study as an inclusion criterion ($n=480$). Exclusion criteria included any nurse who had less than 1 year of experience or was unwilling to participate in the study. The sample size was determined using the Rosoff sample size calculator using the following parameters: population size 480, margin error of 5, confidence interval 95%, and significance level of $p \leq 0.05$. Thus, the minimum recommended sample size was 214. To ensure that we obtained the recommended sample, 480 questionnaires were distributed to the nurses. Out of them, 325 nurses returned the study questionnaire. For the qualitative part, 35 nurses were interviewed based on purposive sampling until data saturation was reached (the point where no new information emerges from the study participants). Participants of a purposive sample were derived from the quantitative sample, as some nurses who participated in the quantitative phase also constituted the purposive sample. They were invited and included based on their availability and willingness as an inclusion criterion to participate at the time of data collection. Participants were chosen to include different working units, current position and educational levels to capture a range of perspectives.

Concurrent Embedded/Nested Design

- **Quantitative and qualitative data are collected and analysed at the same time.**

However, **priority is usually unequal** and given to one of the two forms of data—either quantitative or qualitative data.

- In this case, **both types of data are collected simultaneously, but** one of the two methods is embedded in the other in a way that allows the researcher to address a question that is different from the one answered by the dominant method.
- The **integration of data occurs in the analysis.**



- **Primarily purpose is for gaining a broader perspective** than could be gained from using only the predominant data collection method.
- **Secondary purpose is** use of embedded method **to address different research questions.**

- An example of Concurrent Nested/Embedded Design:

- Strasser et al. (2007) conducted a concurrent nested design to explore eating-related distress of advanced male cancer patients and their female partners.
- The primary method used in the study was focus groups which were attended by patients and their partners with the conduct of these groups and the analysis of the data based on grounded theory (qualitative) techniques.
- The secondary or nested focus of the study was the differences in patients' and their partners' assessment of the intensity and symptoms and degree of cachexia-related symptoms of eating-related disorders of patients. This secondary information was collected by a structured questionnaire which was completed at the time of the first focus group.
- The eating-related distress differed for patients and their partners as indicated in the qualitative findings, and this was complemented by the quantitative findings.

Concurrent Transformative Design

- **Guided by a theoretical perspective** of change.
- **Concurrent collection of both quantitative and qualitative data.**
- **Similar to sequential transformative designs, these designs are useful for giving voice to diverse or alternative perspectives, advocating for research participants, and better understanding a phenomenon that may be changing as a result of being studied.**
- Aims **to address social issues** faced by the group of people.



Table 10.3 Choosing a Mixed Methods Project, Expected Outcomes, Type of Design

Reasons for Choosing Mixed Methods	Expected Outcomes	Recommended Mixed Methods Design
Comparing different perspectives drawn from quantitative and qualitative data	Merging the two databases to show how the data convergent or diverge	Convergent parallel mixed methods design
Explaining quantitative results with qualitative	A more in-depth understanding of the quantitative	Explanatory sequential
data	results (often cultural relevance)	mixed methods design
Developing better measurement instruments	A test of better measures for a sample of a population	Exploratory sequential mixed methods design
Understanding experimental results by incorporating perspectives of individuals	An understanding of participant views within the context of an experimental intervention	Embedded mixed methods design
Developing an understanding of needed changes for a marginalized group	A call for action	Transformative mixed methods design

Research Questions in MMR:

• Think about order of data collection:

➤ If **sequential**, ask first question first, second second.

➤ If **concurrent**, ask questions based on weight or importance- if quan more heavily weighted, start with quan research hypothesis, if qual more heavily weighted, start with qual research questions.

Data analysis in mixed methods:

- It is unusual for qualitative and quantitative data to be analysed together.
- Typically, we use analytic methods appropriate to our data collection strategy.
- Each of our analyses must meet standards of rigor specific to the overall approach.
- The key is actually how we:
- ❖ **Use** each form of analysis.
- ❖ **Integrate** our INTERPRETATION of our analyses.

Advantages of MMR:

- **Compares** quantitative and qualitative data.
- **Reflects** participants' point of view.
- **Fosters** scholarly interaction.
- **Collects** rich, comprehensive data.
- **Words, pictures, and narrative** can be used to add meaning to numbers.
- **Numbers** can be used to add precision to words, pictures and narrative.

Weaknesses of MMR:

- **A researcher has to learn** about multiple methods and approaches and understand how to mix them appropriately.
- Mixed method research can be **difficult for a single researcher** to carry out, especially if the two approaches are expected to be used concurrently.
- Mixed method research is more **expensive** and more **time-consuming**.
- **Little guidance** on transformative methods **in the literature**.

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آخر محاضرة بآخر امتحان بيسك (❤)