



Qualitative Study on the Impact of Vignettes in ... Adeoye, I. F. (2026)

Qualitative Study on the Impact of Vignettes in Basic Science Education at Upper Basic Level of Education in Nigeria: A Conceptual Perspective

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Abstract

Vignettes are increasingly used in science education as instructional and assessment tools for examining learners' conceptual understanding, reflective thinking, and decision-making abilities. In the context of Basic Science education, a vignette is a short, context-based scenario drawn from learners' everyday experiences and aligned with curriculum concepts such as health, environment, energy, matter, and safety. This paper discusses the concepts of vignettes, their major types-descriptive, problem-based, reflective and decision-oriented-and their application in Basic Science teaching and research. Both offline (paper-based) and online (digital) vignettes are highlighted as flexible approaches suitable for varying classroom contexts. Criteria for constructing good vignettes include clarity of purpose, realism, cultural relevance, alignment with Basic Science learning objectives, appropriate cognitive demand, and the ability to elicit reasoning rather than rote responses. Research evidence indicates that vignettes enhance learner engagement, promote higher-order thinking, uncover misconceptions, and support the application of scientific concepts to real-life situations. However, limitations such as response bias, over-simplification of complex scientific issues, and challenges in scoring and interpretation are also noted. The paper concludes that vignettes are effective learner-centred tools that complement traditional teaching and assessment methods in Basic Science Education. It is therefore suggested that Basic Science teachers and curriculum developers integrate vignette-based strategies into classroom instruction and assessment, while providing adequate training on vignette design and use to maximise their educational value.

Keywords: Vignette, Basic Science Education, Conceptual Understanding, Reflective Thinking, Decision-Making

Introduction

Basic Science education at the junior secondary school level is designed to develop scientific literacy, problem-solving skills, and responsible decision-making among learners. In Nigeria, the Basic Science curriculum emphasizes the understanding of everyday scientific phenomena related to health, environment, energy, matter, and safety. Despite these goals, traditional instructional and assessment methods such as teacher-dominated lectures and recall-based written tests, often limit learners' active participation and fail to adequately assess their conceptual understanding and application of scientific knowledge (NERDC, 2013). This gap has prompted increased interest in alternative, learner-centred approaches, including the use of vignettes in education. Vignettes are short, brief, descriptive, context-based scenarios that depict a situation, event, or set of circumstances and are designed to stimulate thinking, discussion, judgment, or decision-making.

Vignettes are often written in narrative form and can reflect real-world contexts relevant to learners. Vignettes are used both as data collection to elicit responses from the respondents and as instructional materials to prompt problem-solving and reflection in education. From a conceptual perspective, the use of vignettes in Basic Science education is grounded in constructivist learning theory, which posits that learners actively construct knowledge through interaction with their environment and social experiences (Piaget, 1973; Vygotsky, 1978). By situating scientific concepts within familiar contexts such as homes, schools, and local communities, vignettes support meaningful learning and help learners connect abstract scientific ideas to real-life experiences. Compared with traditional methods, vignette-based instruction offers clear advantages. Instructionally, vignettes promote inquiry, discussion, and critical thinking, encouraging learners to analyse situations rather than memorise facts. As assessment tools, vignettes enable teachers to probe learners' reasoning processes, identify misconceptions, and assess higher-order cognitive skills that conventional tests often overlook (Barter & Renold, 2000). In Basic Science education, where understanding concepts and applying them to daily life is essential, vignettes provide a flexible and effective approach for both teaching and assessment. Thus, the conceptual approach to vignette use positions vignettes as powerful instructional and assessment tools that complement and extend traditional practices in Basic Science education.



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Criteria for Well-Structured Vignette

A well-structured vignette is not merely a short story or description; it should be purposefully designed to elicit meaningful responses, align with the study's objectives, and maintain validity. Skilling and Stylianides (2020), St-Marie and Jimmerson (2021), and Wester et al. (2024) identify the following criteria for good vignettes in education:

1. The vignette should be clear about what it is intended to measure or explore and should directly relate to the research questions or learning objectives.
2. A good vignette should undergo validity by subject matter experts to confirm that the content is relevant and important, ensuring it represents the construct being measured to enhance content relevance and importance before use.
3. A quality vignette should describe situations that participants can recognise and relate to in real life. This simulates real decision-making and enhances the authenticity of responses.
4. The language used should be neutral and unbiased, avoiding leading phrases that push the respondent towards a particular answer.
5. A good vignette provides enough detail to make decisions yet avoids unnecessary complexity that overwhelms respondents. There should be sufficient clues for interpretation.
6. Vignettes should be grounded in relevant educational theories or constructs to enhance interpretive rigour. This ensures that responses can be meaningfully interpreted within a scholarly framework.
7. Vignette should be designed to capture variations in real situations, e.g. cultural contexts. This supports generalisation and reduces bias.
8. Vignette should have an appropriate length and focus on the key issue, avoid irrelevant narrative details and keep respondents engaged without overloading the content.
9. Before final use of the designed vignettes, the vignettes should be piloted with a small sample to check for clarity, comprehension, and consistency of interpretation. Pilot testing helps identify ambiguous phrases, misinterpretations, and unexpected emotional reactions.
10. Good vignettes should specify how and when the vignette is presented, e.g. in an interview, survey or online, and ensure participants are oriented to the task before responding.

Every effective vignette should have four parts: the context, the problem/dilemma, the trigger question, and concepts linked to the subject.

Types of Vignettes

In education, there are different types of vignettes depending on their intended use. Instructional vignettes are used as learning tools to stimulate reflective thinking, bridging theory and practice, enhance students' application of knowledge, encourage ethical reasoning and explore cultural interpretations. Assessment vignettes evaluate contexts that include performance assessment, scenario-based testing and simulated decision-making tasks, while cross-cultural/comparative vignettes examine how cultural or contextual differences shape interpretation and decision-making. There are two approaches for disseminating vignettes in the classroom: offline (paper-based) and online (digital). The offline, traditional, or face-to-face vignettes are paper/text scenarios or in-class discussions, and the narrative vignettes are used in interviews or reflective exercises. The benefits of the off-line vignette include rich in-person discussion, promotes immediate teacher-learner interaction, and provides grounding in context. However, the online, digital, or multimedia content typically includes video or digital modules and web-based surveys with hypothetical scenarios. The benefits include support for large-scale quantitative analysis, increased realism and contextual understanding and flexible timing and pacing for respondents. The challenges of online vignettes include limited access to technology and internet connectivity, reduced immediate social interaction, and diminished real-time discussion dynamics.

Literature Review

Theoretical, conceptual, and empirical frameworks for the use of vignettes in education are reviewed. The theoretical framework explains why vignettes work as teaching, assessment and research tools. Vignette use is grounded in several well-established learning theories, including situated learning, constructivist learning, and experiential learning. Brown, Collins, and Duguid (1989) emphasise that learning is most effective when knowledge is presented in real-life contexts rather than as abstract facts. Vignettes are presented to learners in contextualised scenarios that enable them to construct meaning within familiar situations. The educational implications of this theory indicate that vignettes help learners apply

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basic learning concepts to daily life and bridge the gap between theory and practice. The constructivist learning theories of Piaget (1972) and Vygotsky (1978) emphasise that learners are active constructors of knowledge, drawing on prior experiences and social interaction. Presenting vignettes as an instructional aid activates learners' prior knowledge and discussing them promotes social interaction and meaningful knowledge acquisition and application. The educational implications of vignettes based on constructivist theory indicate that they support conceptual change, correct misconceptions, and promote active learning. Furthermore, Kolb's (1984) experiential learning theory posits that learning occurs through experience, reflection, and application. Vignettes stimulate real-life experiences without exposing learners to risk. The educational implications of this learning theory indicate that learners reflect on situations, apply the concepts learned in real-world contexts, and make informed personal decisions. In addition, vignettes move learners beyond remembering to analysing, evaluating and synthesising in Bloom's objective taxonomy of cognitive domain. Vignettes are used to situate learning in context, encourage active construction of knowledge and promote experiential and higher-order thinking. The conceptual framework of vignettes in education illustrates the cause-effect relationship between the use of vignette-based approaches and learning outcomes in education. The key variable is the vignette-based approach, characterised by real-life and contextualised scenarios, problem-based situations, and guided reflective questions. These features stimulate learners' thinking and connect classroom learning to everyday experiences. The intervening (mediating) variables determine several processes that influence the vignette-based approach, including active learner engagement, critical and analytical thinking, and reflection and discussion. These processes explain how the use of vignettes leads to improved learning outcomes. The moderating variables influence the strength and direction of the relationship between vignette use and learning outcomes. These include learners' prior knowledge and teacher facilitation skills. The learning environment and resources, and the time allocated for instruction, are independent variables, whereas the dependent variables represent measurable learning outcomes, such as academic achievement, conceptual understanding, critical thinking, problem-solving, environmental awareness, and decision-making. The relationships among the variables are represented in Figure 1 using vignette-based instruction.

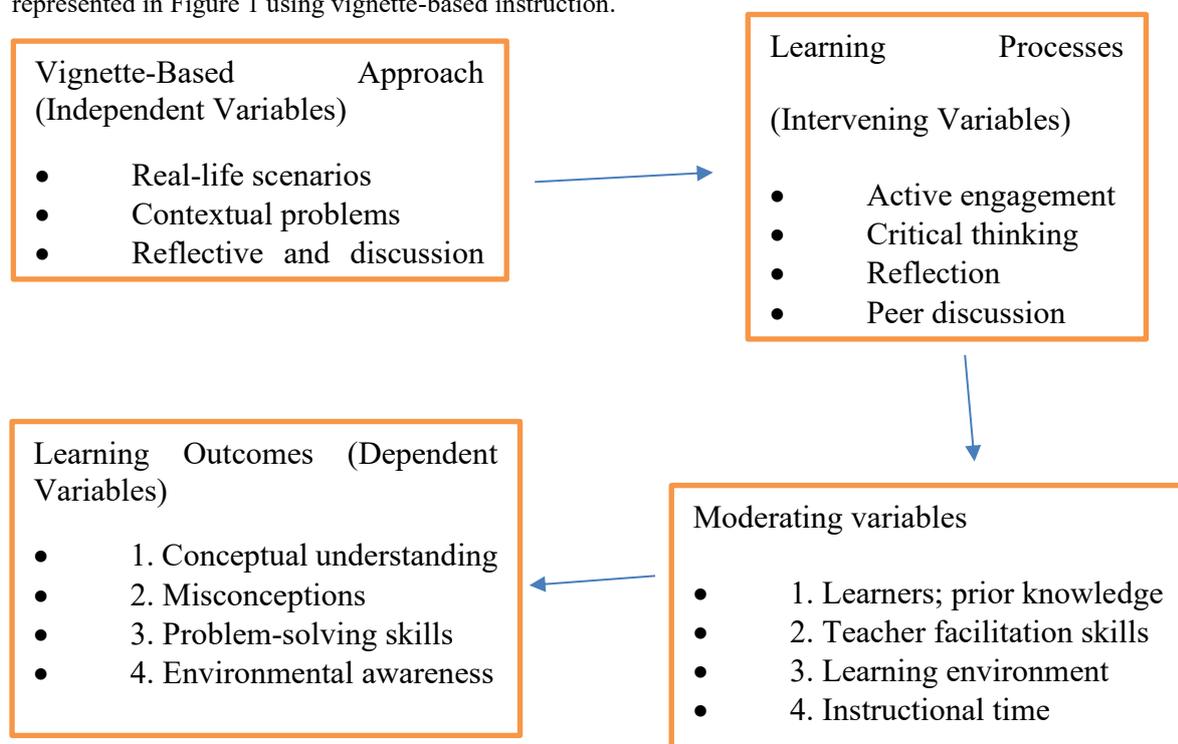


Figure 1: Proposed Conceptual Framework among Variables on the Use of Vignettes in Education

Vignette-based learning tasks expose learners to realistic scenarios, foster active engagement and reflection, and support discussion, reasoning, and improved understanding, skills, and attitudes. The conceptual framework depicts vignettes as



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instructional stimuli that elicit cognitive and affective processes, thereby improving learning outcomes. Empirical evidence indicates that vignettes elicit judgment and reasoning and are superior to direct questioning for exploring learners' knowledge and beliefs (Finch, 1987).

Empirical Review of Vignettes in Education: Benefits and Limitations

Vignettes have increasingly been used as research and instructional tools in education because they can simulate real-life situations while maintaining ethical research practices. One key advantage is that vignettes facilitate discussion on sensitive or ethically charged topics without requiring participants to disclose personal information. This makes vignettes particularly valuable in health and teacher education, where participants can reflect on mental health issues, stigma, or classroom dilemmas in a safe and structured manner (Western et al. 2024; Sheehy et al., 2023). Vignettes also enhance the collection of rich qualitative data by eliciting participants' beliefs, interpretations, and decision-making processes that may not be revealed through surveys or structured questionnaires (Skilling & Stylianides, 2020). In teacher education, video vignettes have been shown to improve prospective teachers' professional vision and diagnostic skills, helping them analyse classroom scenarios more effectively and develop inclusive teaching strategies (Giek et al., 2025). Similarly, vignette designs enable the simultaneous exploration of multiple variables, supporting causal inferences in educational research. For example, online vignette studies have examined the effect of teaching modality and feedback type on learner motivation and engagement (Wirag, 2026). Furthermore, vignettes promote reflective discussion and peer interaction, enabling learners to connect theoretical knowledge with practical situations, thereby increasing task authenticity and cognitive engagement (Giek et al., 2025). They also provide methodological flexibility, being compatible with qualitative, quantitative, and mixed-methods research, and offer research economy by allowing efficient investigation of multiple research questions with limited resources (Skilling & Stylianides, 2020; Wirag, 2026).

Despite these advantages, vignettes are not without limitations. The hypothetical nature of vignette scenarios may reduce external validity, as participants' responses do not always reflect real-world behaviour (Western et al., 2024). Contextual and cultural biases can also arise if vignettes do not adequately represent the diversity of the real-life environments (Sheehy et al., 2023). Simplified scenarios may overlook the complexity of classroom interactions, and participants' interpretations can vary, resulting in ambiguous data (Skilling & Stylianides, 2020). Additionally, designing vignettes that are valid, reliable, and representative requires careful planning, pilot testing, and expert review, which can be resource-intensive (St-Marie & Jimmerson, 2021). Vignettes may also underrepresent the voices of marginalised groups if scenarios are not inclusively designed (Sheehy et al., 2023). In summary, vignettes are powerful tools for enhancing reflective learning, investigating beliefs and decision-making, and promoting engagement in educational research and practice. However, researchers must carefully design and validate vignettes to mitigate issues related to generalisability, cultural bias, and interpretive ambiguity. The benefits and limitations of vignettes suggest that their effective use requires balancing methodological rigour with the construction of realistic scenarios (Skilling & Stylianides, 2020; Western et al., 2024; Wirag, 2026).

Classroom Vignette for Basic Science in the Nigerian Context

This section presented well-constructed classroom vignettes that can be adopted or adapted to elicit learners' conceptual knowledge, reflection and decision-making from respondents. These vignettes are suitable for learners in Junior Secondary School one to three (JSS1-3).

Topic 1: Environmental Pollution (Theme: You and the Environment)

Vignette 1A: Refuse Burning in the Community

During a Basic Science lesson on environmental pollution, the teacher explains that incinerating waste produces air pollution. A student reports that in their community, refuse is burned behind houses and that "people are still healthy." Other students agree, mentioning that there are no waste trucks in their area. The teacher should decide how to respond.

Elicits:

1. Conceptual knowledge: Air pollution and health effects.
2. Reflection: Traditional practices versus scientific explanation
3. Decision-making: Culturally responsive teaching.



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Vignette 1B: Pollution Stream

Students are discussing water pollution using a nearby stream as an example. One student argues that the water cannot be polluted because people still fetch it and fish are observed swimming. The teacher should consider how to explain invisible pollutants and health risks.

Elicits:

1. Conceptual knowledge: Water pollution.
2. Reflection: Visible versus invisible contamination
3. Decision-making: Pedagogical decision

Topic 2: Energy and Energy Sources (Theme: Energy)

Vignette 2A: Generator Use

While teaching about energy sources, the teacher explains renewable and non-renewable energy. A student argues that generators are better than solar energy because electricity supply is unstable in Nigeria. The class begins to debate.

Elicits:

1. Conceptual knowledge: Energy sources
2. Reflection: Practicality versus sustainability
3. Decision-making: Balancing curriculum and reality.

Vignette 2B: Electricity conservation

During a lesson on energy conservation, a student says that leaving appliances plugged in does not waste electricity because the Power Holdings Company of Nigeria (PHCN) light is already on. The teacher notices several students nodding in agreement.

Elicits:

1. Conceptual knowledge: Energy wastage
2. Reflection: Everyday misconception
3. Decision-making: Instructional decision-making.

Topic 3: Matter and Its States (Theme: Matter)

Vignette 3A: Melting of Ice Block

In class, the teacher shows students a block of ice melting in a bowl. A student says the ice has “disappeared” because it is no longer solid. The teacher reflects on how to explain conservation of matter.

Elicits:

1. Conceptual knowledge: Change of state
2. Reflection: Physical change
3. Decision-making: Teaching decision-making.

Vignette 3B: Air has no Mass

While discussing matter, a student insists that air has mass because it cannot be seen. The teacher has limited time and must decide whether to conduct a simple demonstration or continue the lesson.

Elicits:

1. Conceptual knowledge: Properties of gases
2. Reflection: Abstract scientific ideas
3. Decision-making: Classroom decision-making.

The teacher should conduct an experiment to show the concept.

Topic 4: Living and Non-Living Things (Living and Non-Living Things)

Vignette 4A: Virus Classification

During a lesson on characteristics of living things, a student asks whether viruses are living or non-living. The class gives mixed answers and the teacher notices confusion.

Elicits:

1. Conceptual knowledge: Characteristics of life.
2. Reflection: Scientific uncertainty
3. Decision-making: Handling complex concepts.

Vignette 4B: Movement in Plants



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A student says plants are non-living because they do not move from one place to another. The teacher must determine how to explain plant movement using examples familiar to Nigerian students.

Elicits:

1. Conceptual knowledge: Plant movement.
2. Reflection: Observable versus internal processes
3. Decision-making: Teaching strategy decision

Topic 5: Safety and Health Education (Theme: Safety and Health)

Vignette 5A: Laboratory Safety

Before a Basic Science practical, some students refuse to wear goggles, saying they have never seen anyone injured before during practical activities. The teacher is under pressure to complete the practical within the period.

Elicits:

1. Conceptual knowledge: Laboratory safety rules
2. Reflection: Risk awareness.
3. Decision-making: Safety versus time management.

Vignette 5B: Hand Washing and Hygiene

During a lesson on personal hygiene, a student claims handwashing is unnecessary if hands look clean. Other students support the idea, citing home practices.

Elicits:

1. Conceptual knowledge: Disease prevention.
2. Reflection: Appearance versus hygiene.
3. Decision-making: Pedagogical decision-making.

The Standard Response Prompts

The respondents should answer the following question to align with the constructed vignettes.

1. What Basic Science concept is involved in this situation?
2. Identify any misconception shown.
3. How would you respond to the situation?
4. Give reasons for your decision.

Conclusion

Vignettes have proven to be a valuable pedagogical and research tool in education, particularly for eliciting learners' conceptual understanding, reflective thinking, and decision-making skills. By presenting realistic, context-based scenarios, vignettes bridge the gap between abstract concepts and real-life experiences, enabling learners to engage meaningfully with subject matter. In Basic Science education, especially within Nigeria context, vignettes align well with curriculum goals by addressing common misconceptions, promoting scientific reasoning and encouraging learner-centred instruction. Vignettes flexibility allows for use across cognitive, affective and behavioural domains, making them suitable for assessment, classroom instruction and educational research.

Recommendation

Based on the theoretical, conceptual and empirical insights of this article, the following recommendations are made:

1. Instructional practice: Basic Science teachers should adopt vignette-based strategies to support learners-centred instruction, particularly for teaching abstract concepts and addressing common misconceptions.
2. Curriculum implementation: curriculum planners and educators should incorporate vignettes into classroom activities and continuous assessment practices to promote higher-order thinking and real-life application of scientific knowledge.
3. Teacher education programmes: Colleges and faculties of Education should include vignette design and use as part of science teacher training, focusing on reflective questioning and decision-making tasks.
4. Assessment and evaluation: Vignettes should be used as alternative assessment tools to evaluate not only factual knowledge but also learners' reasoning, judgement and problem-solving.
5. Blended learning approaches: Both offline (paper-based) and online (digital) vignettes should be employed to accommodate variations in school resources and learners' access to technology
6. Future studies should examine the empirical findings on the effects of vignette-based instruction on learners' academic achievement, retention, and transfers of learning across different science subjects.



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