Teaching to Improve Six-year-old First-graders’ Understanding of Number Sense Concepts

Навчання для покращення розуміння шестирічними першокласниками числових понять

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ABSTRACT
Introduction. The focus of this qualitative study aimed to investigate how teaching to improve number sense concepts understanding to grade one learners can be attained as this is relevant to build a strong mathematics background.

As the purpose was to improve number sense concepts understanding, the study employed a purposive sampling technique in its method, resulting in a total of five participants selected based on specific criteria. This method was guided by a research question: How do we teach to improve number sense concepts understanding to grade one learners? Data were collected through interviews, observations, and document analysis and analysed using thematic analysis.

Some of the results in the findings useful to improve number sense concepts understanding include contextualizing using mediating tools that are in the learners’ environment.

The conclusion drawn is the findings contribute to the existing literature and provide valuable insights for educators, policymakers, and researchers on how teaching to improve number sense concepts understanding to grade one learners can be achieved. The prospect lies in its importance to provide strategies that can be used to improve number sense concepts understanding in the context of the area where it was carried and even extrapolated to other contexts and also at the same time build a strong mathematics background at an early stage.

Key words: number sense, understanding, pedagogical approaches, concepts.

Introduction

Teaching to improve number sense concepts understanding to grade one learners is crucial for a learner to be able to engage in other mathematics concepts or constructs he encounters in future. This is so since number sense concepts act as the solid foundation upon which any other mathematics concepts the learner will encounter and intend to construct in future are built on as Ball (2015) opines. Besides that, mathematics concepts manifest conceptual progression and cohesion nature Kriek and Basson (2008) suggest. This then makes understanding of number sense concepts important. We also have the same opinion like Thomas and Thomas (2020) who see number sense skills as enabling individuals to work with numbers in a flexible and intuitive manner, and to apply mathematical concepts to various contexts and problem-solving scenarios. According to Yilmaz (2017) the above is the general definition used to understand what number sense entails as revealed from many studies and other explanations exist (Schneider & Thompson, 2000).
Even though the concept of number sense has been done in many areas, these mention the context of the area of study excluding the context in our case. It is for this reason this study aims to explore teaching to improve number sense concepts understanding to grade one learners in the Zambezi Region, Namibia. The research question that guided us to generate the data for this is: “How do we teach to improve number sense concepts understanding to grade one learners?”.

It is for this reason we bring first a background to support the need to find how teaching to improve number sense concepts understanding to grade one learners can be attained in this area and other areas with similar conditions. Secondly is how the problem manifests itself and followed by conceptual frameworks related to number sense and also thirdly is the theoretical frameworks that will be used as a lens. The methodology follows and then data generated is presented and then analysed. Findings are given and recommendations done and finally is the conclusion.

**Background**

Number sense is perceived as one of the hardest concepts to understand for learners to grade one as Ross (2021) identifies. This is principally because number sense is made up of a spectrum of ideas that covers a range of numerical thinking. Ways to teach these broad ideas are presented in the official curriculum of each education system using the perspective of that author or dominant culture. That is, the context which they reflect are those of the curriculum planners and this does not suit the diverse learners found in regions of a country of which the Zambezi Region of Namibia where the study was carried has got such a scenario. On account of cultural diversity, the cultural artefacts, cultural activities, cultural metaphors and analogy the curriculum present as examples to use when teaching to develop number sense understanding are not a perfect fit into the learners’ cognitive system.

An example is a scenario like that where one size of an attire is forced to fit all (Ball, 2015). If the idea of an official curriculum is suitable for all is embraced in teaching number sense, this leads learners to be passive. Instead, they need to be active constructors.
of knowledge (Askew, 2016). Our understanding from Piaget (1975) is dissonance, from the psychological perspective is an uncomfortable cognitive state existing when new knowledge does not match with knowledge already stored in one’s cognitive system. Dissonance need to prevail when a concept is first presented (Borah et al., 2020). As a result of dissonance prevalence, this helps to assimilate or accommodate the number sense concepts taught. Teaching with this in mind result in understanding of number sense concepts. As a consequence, deep learning Liu (2022) suggests is important in learning occurs.

Basing on cognitive dissonance theory, individuals incline to seek consistency among their cognitions, that is beliefs, opinions and even values about number sense concepts. When an inconsistency exists between attitudes or behaviours (dissonance), one thing must change to remove the dissonance. In the case of an anomaly between attitudes and behaviour, it is most likely that the attitude will change to accommodate the behaviour. Recognition of the need to innovate using the official curriculum where number sense concepts appear is not done henceforth the manifestation of this problem.

**Manifestation of the Problem**

Teaching number sense concepts using the right context and models that epitomises a learners’ prior knowledge is of importance (O’Connell & Boucher, 2022). This is particularly crucial in schools characterized by absence of Eurocentric infrastructure that the curriculum provides and encourages to use as examples in teaching and make learners understand number sense concepts. That is, they play the role of acting as teaching and learning material in developing number sense concepts. However, the absence of context and models that are perfect fit of a learner’s prior knowledge the curriculum advocates to use in teaching creates a gap which lead learners not to understand number sense concepts. This only happens to learners who are in those areas where the context and models in curriculum materials are not from their environment. Those learners from where the context and models are from their surroundings are at an advantage. This gives some other learners in other schools limited opportunities to develop more advanced mathematical concepts which are linked to number
sense concepts. At the end this affects negatively their academic success and career prospects (Park & Brannon, 2014). Number sense concepts are the backbone of numeracy development in other grade levels. Besides that, concepts in a discipline show conceptual cohesion and progression (Kriek & Basson, 2008). To ameliorate this situation this study discusses how to teach to improve number sense concepts understanding to grade one learners when the context need to be changed to suit what they already have as prior knowledge so that dissonance is created. In creating dissonance, understanding of number sense is attained. The embracing of learners’ context enables this study to answer the research question: How do we teach to improve number sense concepts understanding to grade one learners? Some literature that support our ideas on how number sense can be developed to grade one learners is discussed below.

**Conceptual Frameworks**

The construct of number sense has a wide spectrum and refers to the skill to know and understand and how to handle numerical values flexibly and in an intuitive way and deals with a child’s fluidity and flexibility with numbers (Ghazali et al., 2021). The spectrum of which number sense is made up of encompasses a range of concepts of which some include to estimate, compare, classify, order, decompose, and manipulate numbers, as well as an understanding of the relationships between numbers and their properties. Number sense is considered a critical component of numeracy language proficiency and is essential for success in many academic and real-world contexts as Charles and Lobato (2000) suggest. It permit individuals to solve mathematical problems and make sound judgments in a variety of contexts, such as budgeting, measuring, and interpreting data and many more others (van Nes & van Eerde, 2010).

Number sense is considered a critical component of mathematical proficiency as it forms part of the foundation to familiarize with numeracy. The concepts which are in the spectrum making up number sense can be presented as models or one can use other mediating tools and each has its own model. For instance, fractions can be understood using area model or angle model (Mukwambo et al., 2018).
As an example, an area where models are at play when teaching number sense related to role of numbers in daily life such as when the nature of numbers for instance, cardinality, ordinal and nominal need to be constructed. According to Yilmaz (2017) number sense concepts is classified as knowledge that can be taught using models. The model for cardinality is quantity in a set. Ordinal is when a number represent order, for instance order of sons and daughters in a particular family and numbers are indicated to stand for positions. Finally, a number used as a name to a person or animal respectively brings the idea of nominal. These serve as cultural practices useful for understanding number sense but however, these cultural practices need to be selected with care in order for them to epitomise the prior knowledge of the learner.

**Theoretical Frameworks**

The sociocultural theory of Vygotsky (1986) which explains the contribution and importance of society where there are structures such as culture and language to an individual’s development will be used as a lens to find how and explain how the teaching to improve number sense concepts understanding to grade one learners can be achieved. Also to be used as a lens is the cognitive constructivist theory of Piaget (1975) since the idea of dissonance, assimilation and accommodation has already been explained in the previous section and these according to what we view is they are essential in the area of number sense understanding. These theories were selected on account of them valuing that learners have early and consistent exposure to mathematical concepts and experiences for developing number sense as (Yilmaz, 2017) views. Secondly because we see that understanding of a construct such as number sense is dependent on whether models or any other mediating tool mentioned before are local and real, epitomize a learner’s daily experience of number sense.

The number sense knowledge gained during early and consistent exposure to mathematical concepts and experiences is suitable as a scaffold Wood et al. (2006) see important so that that particular learner can construct the knowledge for number sense in the curriculum. The objective of scaffolding is to produce an atmosphere where the learner feels contented to question questions until he can perform the
skill without any help. Prior knowledge related to number sense gained during social interaction can be used to attain a learner’s zone of proximal development which is Vygotsky (1986) way of scaffolding. That is prior knowledge a learner has can act as a base domain knowledge which can be used to understand knowledge in the target domain, knowledge in the curriculum. To sum in line with the given example, prior knowledge can facilitate the use of an analogy in teaching to understand number sense concept as Gentner (1982) points.

On the other hand, from the view of cognitive constructivist theory, prior knowledge gained during social interaction is one used for assimilation or accommodation. These activities of assimilation and accommodation occur if there is conflict in other cases referred to as dissonance. As we know, conflict lead to positive development as Marx (1947) states. Knowledge of which prior knowledge is one and knowledge in the curriculum as social structures emerged by members of a given society are in a state of perpetual conflict because of the need to establish truth. The stated background, how the problem of number sense development manifests itself, the given conceptual and theoretical frameworks allow us to have a methodology stated below.

**Methodology**

The interpretivist research paradigm greatly influenced the emerging of data in this study. Believe in this paradigm is that reality is shaped by individuals’ subjective experiences of the external world as Mugenda and Mugenda (2012) propose. Interpretive research comprises a framework and practice within social science research that is dedicated to philosophical and methodological approaches to understand social reality as Kumar (2015) states this. This study aims to comprehend and interpret teaching to improve number sense concepts understanding to grade one learners in the Zambezi Region. Interpretivism is a research paradigm that emphasizes subjective interpretation of social phenomena, of which social interaction is one during time when learners undergo social intercourse which lead them to come up with prior knowledge related to number sense concept. This makes this paradigm incline to the conviction that reality is constructed through the meanings that people assign to their experiences, which are influenced by social and cultural
factors. In interpretivist research, the researcher engages in an inquiry process aimed at understanding the meanings and perspectives of the individuals or groups being studied. The researchers sought consent from the sample made up of five teachers in order to engage them with the instrument. However, since the researchers did not interact with the learners but only with the documents, learners’ classwork, it was found not necessary to seek consent from these learners. As a result, this study used instruments such as interviews, observation, and document analysis.

First instrument to engage with was observation. In this case the objective was to familiarize with the pedagogical styles the six teachers selected purposefully were using in teaching to improve number sense concepts understanding to grade one learners. The different styles were rated to find how the learner performed and this was obtained when document analysis of learners’ work was analysed at the end. The interviews which were engaged after the observation had the responsibility to seek the views of the teacher on how best understanding of number sense development can be achieved. This resulted in generating data which we present below and then analysed in the next section.

**Data Generated**

We first present data obtained during observation of the participating teachers. Thereafter, we present data generated during interviewing the participants. Finally, to present is the data generated when the classwork (documents) of learners were analysed after they were taught using different pedagogical styles and also when these teachers were using different learning and teaching media of which others were within the context of the learners and others not. This also applies to the examples used, some had a connotation of learners’ culture and other teachers did not embrace this.

Table 1 present data under the headings participant, where pseudonyms were used, pedagogical style the participant engaged, learning material the participant used and examples used to ensure deep learning of number sense concept occur. The pedagogical style was ranked as innovative and a hybrid if the teacher only used the official curriculum as a guideline to bring the construction of number
sense so that there is improvement in its understanding. On the other hand, pedagogical style where one stick to the official curriculum is whereby the participant never made changes to what appears in the official curriculum.

Likewise, teaching and learning materials (TLM) were classified as official and those from learners’ environment. Those from learners’ environment were considered to reflect the context which the learners can create dissonance and thereafter understand number sense well. Also, with examples used and were observed under use were classified as either reflecting what is in the learners’ culture or those only from the official curricul.

Table 1
Data from Observation

<table>
<thead>
<tr>
<th>Participant</th>
<th>Pedagogical style engaged</th>
<th>LTM brought</th>
<th>Examples used</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Innovate and hybrid</td>
<td>A mixture from official curriculum emphasis and those from learners environment</td>
<td>Metaphors, analogy, similes from learners environment and curriculum</td>
</tr>
<tr>
<td>B</td>
<td>Innovative and hybrid</td>
<td>A mixture from official curriculum emphasis and those from learners environment</td>
<td>Cultural practices from learners’ environment and nature of numbers in the learners’ environment.</td>
</tr>
<tr>
<td>C</td>
<td>Sticks to what is in the official curriculum</td>
<td>Only from the official curriculum</td>
<td>Examples from the official curriculum</td>
</tr>
<tr>
<td>D</td>
<td>Innovative</td>
<td>A mixture from official curriculum emphasis and those from learners environment</td>
<td>Cultural artefacts from learners environment</td>
</tr>
<tr>
<td>E</td>
<td>Sticks to what is in the curriculum</td>
<td>Only from the official curriculum</td>
<td>Examples from the official curriculum</td>
</tr>
</tbody>
</table>

The data from the table supported the use of interviews. That is to know why each of those participants presented using the way they have done. The idea was to understand for instance why a teacher used cultural artefacts, analogy in learners’ culture into his practice. Richard et al. (2004) consider analogy as valuable in bringing understanding. For this reason, we found interviews as an appropriate instrument for this.
Data from Interviews

Besides knowing why, the participants used cultural artefacts, analogy in learners’ culture in his practice there was a need to understand how innovation and hybridization Bhabha (1994) value as necessary of pedagogical styles helped to improve number sense concepts understanding to grade one learners from the perspective of the participants. Also, the reason to use a concoction of learning and teaching media from learners’ environment and those the official curriculum encourages also helped to answer our research question: How do we teach to improve number sense concepts understanding to grade one learners? Table 2 is meant to present this data.

Table 2
Data Generated from Interviews

<table>
<thead>
<tr>
<th>Participant</th>
<th>Reason to engage style</th>
<th>Reason to bring LTM</th>
<th>Reason to use example</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Learning for understanding starts from what is known and then linked to what is in the curriculum</td>
<td>A selection from both sources of knowledge helps in deep learning of number sense concepts</td>
<td>Metaphors, analogy, from learners environment act as a perfect fit to number sense in official curriculum.</td>
</tr>
<tr>
<td>B</td>
<td>Assimilation or accommodation prevail if first what a learner knows is first discussed and then related to what is needed.</td>
<td>LTM from other knowledge sources can also be brought since they contextualize teaching</td>
<td>Helps to remove gaps in knowledge as the examples when discussed improves number sense understanding</td>
</tr>
<tr>
<td>C</td>
<td>Learners need to be developed in such a way that they construct number sense concept that is at the same level with others in other schools, so no deviation must be made from the official curriculum</td>
<td>Even if there is no LTM reflecting what the curriculum suggest, I must improvise to come with such LTM to ensure what we teach in all schools is uniform</td>
<td>Examples in curriculum material are properly edited and are the only recommended ones</td>
</tr>
<tr>
<td>D</td>
<td>Use of hybrid pedagogical facilitate understanding of number sense concepts</td>
<td>Artefacts in a learners’ environment can also reflect number sense concepts so they can be embraced</td>
<td>Helps to bring the culture of the learner that has same knowledge of number sense as it appears in official curriculum</td>
</tr>
</tbody>
</table>
It is important that a teacher align his teaching and learning practices to the official curriculum. No any other materials must be used except those the official curriculum encourages. The curriculum is rigid. No changes should be made.

The above data was generated aligning to the research question: “How do we teach to improve number sense concepts understanding to grade one learners?”. Headings for column 1, 2, and 3 were put in the form of a question in the interviews the participants were involved. The interview and observation helped to come up with a true picture of how the learners responded the questions they were given as classwork. What follows is data generated when the written documents from learners were analysed.

**Data Generated from Document Analysis**

Data analysed here was from the classwork the learners engaged with after teacher A, B, C, D and E taught them separately. The number sense each teacher taught was different from that of the other teacher. The documents taken for analysis by the researchers were taken randomly. In the class for teacher A, ten learners’ work were taken for analysis. In the class for teacher B, fifteen learners’ work were considered for analysis. In teacher C, D and E, twelve, eighteen and eight documents were taken for analysis respectively. The analysis was based on what was done in the classwork compiled by learners and sought to find out which class did very well and which one did not do well. That is which teacher used styles that best brings the improvement of teaching number sense concept for understanding.

**Table 3**

*Data generated from data analysis*

<table>
<thead>
<tr>
<th>Teacher</th>
<th>Number of learners in a class</th>
<th>Number of learners above 50</th>
<th>Number of learners below 50</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>10</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>B</td>
<td>15</td>
<td>12</td>
<td>3</td>
</tr>
<tr>
<td>C</td>
<td>12</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>D</td>
<td>18</td>
<td>15</td>
<td>3</td>
</tr>
<tr>
<td>E</td>
<td>8</td>
<td>3</td>
<td>5</td>
</tr>
</tbody>
</table>
Data Analysis and Discussion

The practices of teacher A, teacher B and teacher D are the one that are aligned to answer the research question: “How do we teach to improve number sense concepts understanding to grade one learners?”. As can be seen, there were more learners who had understood the number sense concept taught by each of those three teachers. The scenario is different if we look into the data of teacher C and teacher E. There are more learners who did not attain a mark above fifty with teacher C and teacher E. This suggest that the teaching style each used is not in favour of improving number sense concepts understanding. This is different from what is reflected from the data emerging from teacher A, B and D. We turn our focus to how each of the three teachers were
presenting their lessons as this data was generated during observation. That alone shows teaching that can improve understanding of number sense concepts to grade one. The following reveals how each of those teachers A, B and D conducted their teaching practices

**Teacher A Teaching Practices**

The number sense concept teacher A taught was about fraction. The objective was to enable the learners know what fractions are using instructions Mohammed et al. (2023) view critical to improve understanding of number sense concept. To start with he brought a metaphor using a well-rounded water melon, a structure in learners’ culture Vygotsky (1975) mentions is important instead of an orange or pizza fractional metaphor the curriculum encourages to use but not within his learners’ reach because oranges are scarce in the area and are only in shop shelves to understand the concept of half as a number sense concept. He cut the water melon into two equal parts and thereafter showed the learners indicating to them that each of the pieces of water melon is half of the entire fruit. He later on brought the idea that any part of the given water melon when partitioned into two equal parts, each represents part of the entire water melon and represent a half.

Teacher A values that analogical reasoning is another way of improving the teaching of number sense concept of fractions. This is evident since he went to use an analogy of water in a bore hole during the dry season when there is a small amount of water left and during the wet season when it is raining when water table is high and bore hole is full. The bore hole when it is full is taken as two in the denominator of half and when it is dry the water table goes down and what remains is a part of the water which was initially in the bore hole and is taken as one in the numerator of the fraction half. This served as base domain knowledge which learners have as the school was characterized by not having Eurocentric infrastructure and the use of analogy in curriculum brought teaching practices not in context to learners, as a result learners are deprived from deep learning (Liu, 2022). However, the target domain of understanding a 1 and a 2 in the fraction half was achieved through this analogical reasoning. As a result, this served as a way to improve teaching number sense concept of fraction half to learners to understand what a half is. To ensure that numeracy necessary to make the learners communicate globally he brought in what is in the curriculum after he had initially brought ideas from learners’ environment to create
dissonance Piaget (1975) suggest is important for assimilation or accommodation to occur

**Teacher B Teaching Practices**

Like teacher A who embraced social and cultural view from learners’ culture Vygotsky (1975) of number sense, teacher B engaged cultural practices Mukwambo (2016) mentions as important in developing understanding. Teacher B brought an understanding of the nature of numbers in learners’ cultural practices to understand the terms cardinality, nominal and ordinal which are number sense concepts related to role numbers play in daily life. What she did was to consider cardinality as related to quantity. Cardinality determines the quantity of items in a given set. A number playing the role of nominal purposes is when a number is used as a name for a particular object or person. For example, Mr. Seven has two daughters and one son only. Seven in this case is being used for nominal purposes. To understand the ordinal nature of numbers she brought the idea of indicating the position of an object in relation to the other. For instance, learners were tasked to mention position they occupy in their families. That is if one is first born, second born, third born and others in their family. These cultural practices were then related with the examples in the official curriculum and in so doing it went to instil the learners to learn with understanding as they engaged deep learning Liu (2022) consider is important. Consequently, this made the majority of learners to score marks above fifty as seen Figure 1. So, we arrived at saying use of cultural practices in a learners’ culture contextualize teaching and helped improve understanding of number sense concept of cardinality, nominal and ordinal.

**Teacher D Teaching Practices**

Still with teacher D, innovation and hybridization Bhabha (1994) consider is important in one’s teaching philosophy emerge pedagogical styles that are in context. This was achieved by looking into what is in learners’ environment that can act as a base domain knowledge to understand the target domain material, knowledge in the official curriculum about number sense of a geometrical concept, shape of a cone. In his case the number sense concept he taught was about identifying three dimensional geometrical shapes. The shape under consideration was a cone. For the learners to know what a cone is he brought a cultural artefact with the shape of a cone used in their community to trap fish when one is fishing. This cultural artefact has
a base that is circular she pointed at, a vertex at the top that is sharp pointed and the walls are made up of circular shape. She dissected the cone for the learner to see more about the shape. Thereafter, that is when he said what is seen in the cultural artefact is what we refer to as a cone. That is the knowledge about a cone in the cultural artefact served as base domain to facilitate understanding of a three dimensional shape a cone which was the target domain, knowledge in the official curriculum.

We see this pedagogical approach as an innovation as the examples of shapes of cone in the official curriculum are not common in the learners’ environment. Teacher D managed to teach the concept of a cone since she enables learners to perform the visualization skills van Hiele (1999) recommends is suitable level for lower primary. Further evidence supporting that she achieved to ensure understanding of the concept of fraction is achieved is because he also used a simile as he went to point out that the base is like a circle. This made the learners answer the questions associated with this level zero of (Van Hiele, 1999). This is what we believe made documents of learners from his class managed to score a more pass rate as compared to the other teachers, C and E. For this reason, such practice help improve the teaching of number sense concept. This answers the research question: “How do we teach to improve number sense concepts understanding to grade one learners?”.

The approach of the other two teachers, C and E were not desirable to bring about improvement in number sense understanding. This is evident from the what Figure 1 shows. There were more learners who did not reach a fifty percent.

**Recommendation**

The findings from this study indicate that if contextualization is to be achieved to ensure understanding of number sense concepts to grade one, mathematical analogy, similes, metaphors, cultural practices and cultural artefacts found in a learner’s environment such as those used in this study need to be used. Teachers on the other hand need to address the factors which limit their effectiveness in order to become more competent by using mediating tools such as those used in this study which helped ameliorate scarcity of resources for teaching. This can be
that they need to be inclusive to all the learners. In our case this was a success because the learners are from one particular culture and were aware of what was brought to support understanding. If the class is made up of learners from diverse culture, then addressing of context can be achieved by embracing all the cultural analogy, cultural artefacts and cultural practice of each learner in one’s teaching practices. This can then address this problem as the teaching interventions accommodate the opportunities of all learners. This study place emphasis on use of innovative pedagogical styles. The innovative pedagogical styles can be achieved through cultural translation as suggested in the literature and this must be done by teachers if they are to improve understanding of number sense concepts in learners.

Conclusions

Teaching to improve number sense concepts understanding to grade one learners is important as it allows learners to have skills that will help them in other grade level as these number sense concepts are the foundation for other mathematics ideas to be learnt. This is true since there is conceptual cohesion and progression in these concepts so they become very important to understand at an early stage. The fact that many teachers do not engage innovative pedagogical styles which address contextualization makes this study important. It has highlighted how cultural analogy, cultural metaphors and similes, cultural practices and cultural artefacts can emerge understanding of number sense concepts as long as they are of the indigenous type. The indigenous analogy, metaphors, similes, cultural artefacts and cultural practices were used as mediating tools to bring understanding of number sense concepts as they have the nature to contextualize. To the teachers who used the mentioned mediating tools it was found that this improves number sense concept understanding to grade one learners. This then has informed us that the contextualizing effect of cultural connoted mediating tools like the one mentioned help improve number sense understanding and this gives a response to the research questioned paused initially.
ADHERENCE TO ETHICAL STANDARDS

Ethics Declarations. All procedures performed with the permission of the teachers who participated in the research for the processing and analysis of their data. All experimental procedures with human participation in the study complied with the ethical standards of the Helsinki Declaration of 1964. This is evidenced from the ethical clearance certificate with reference number: FOE/534/2019 obtained from institute where we conduct research.

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Consent for publication. The authors approve of this submission and, conditional upon the decision made by the editorial board from the peer-review process, consent to the publication of the current work. The work has not been, nor has it been submitted to other journals in consideration for publication.

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АННОТАЦІЯ
Вступ. Це якісне дослідження мало на меті з’ясувати, яким чином можна покращити розуміння концепцій сенсу числа в шестирічних учнів першого класу, оскільки це важливо для формування міцної математичної підготовки.
Мета. Оскільки метою дослідження було покращити розуміння концепцій сенсу числа, у ньому було використано метод цілеспрямованої вибірки, в результаті чого було відібрано п’ять учасників на основі певних критеріїв. Цей метод керувався дослідницьким питанням: «Як ми навчаємо покращити розуміння числових понять в шестирічних учнів першого класу?». Дані були зібрані за допомогою інтерв’ю, спостережень та аналізу документів і проаналізовані за допомогою тематичного аналізу.
Результати. Деякі з отриманих результатів, корисних для покращення розуміння числових понять, включають контекстуалізацію з використанням посередницьких інструментів, які є в учнівському середовищі.
Висновки. Зроблено висновок, що результати дослідження доповнюють існуючу літературу і надають цінну інформацію для освітян, політиків і дослідників про те, як можна покращити розуміння числових понять шестирічними учнями першого класу.
Перспектива полягає в тому, що важливо запропонувати стратегії, які можуть бути використані для покращення розуміння концепцій сенсу числа в контекті тієї галузі, де вони були застосовані, і навіть екстраполювати їх на інші контексти, а також водночас створити міцну математичну базу на ранньому етапі шкільного навчання.
Ключові слова: сенс числа, розуміння, педагогічні підходи, поняття.