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Exploring the concept of teaching sea travel: Experiences from Valverde and Montecristi, Dominican Republic

Eldris Con Aguilar ⬦, Emma Slayton ⬦ and Corinne L. Hofman ⬦

Faculty of Archaeology, Leiden University, Leiden, The Netherlands

ABSTRACT

This article presents the results of a case study in the Dominican Republic on the educational applications of seascapes as content for teaching about the indigenous peoples, the Amerindians, also referred to in the school curriculum as the first inhabitants. This study applied base knowledge theory to investigate how teachers' practice can benefit from using archaeological evidence and theory as an instructional strategy. To this end, we utilized participatory action research methods to involve teachers in the process of exploring activities to test whether teachers could apply these topics and strategies to their own classroom setting. Finally, this paper contributes to a growing field of research in Archaeology Education, in which educators are partners with researchers in transferring archaeological knowledge to learning situations.

Introduction

Our research on the educational application of seascapes to teaching social sciences developed out of a shared interest in education and Amerindian seafaring. Our research goals were: (a) to inquire how teachers in the Dominican Republic might use an archaeological understanding of seascapes to teach schoolchildren about the indigenous peoples of the Caribbean in the period before the European arrival in AD 1492, and (b) to explore additional avenues to use seascapes or maritime spaces in the school curriculum.

One may think that because of the Caribbean's geographical configuration, teachers would often talk about the sea and its influence on the way people lived. This study attempted to determine what educators know about the use of the sea in the past as well as how they teach about seascapes and the sea's influence in the daily life of the first inhabitants of the Caribbean.

To answer these questions, we applied a Participatory Action Research (PAR) approach that engages researchers and participants in the co-construction of knowledge (McIntyre 2008). Because we asked teachers to enquire and to reflect on their own practices (Lassonde and Israel 2010; Baumfield, Hall, and Wall 2013), this work touches upon teacher research, which is also considered a type of action research. Similarly, PAR was applied because of its positive impacts on teaching practice (Carr and Kemmis 1986; Elliot 1990; Stringer 2010). Teachers' feedback on the exercises was therefore a valuable component in the final design of the education material produced after this study.

We expect that the results of this study, which focused on teachers' knowledge and how the idea of sea travel can be applied in teaching about Amerindians of the Caribbean, can contribute to the

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CONTACT Eldris Con Aguilar ✉ e.o.con.aguilar@arch.leidenuniv.nl 🖂 Leiden University, Einsteinweg 2, Leiden 2333 CC, The Netherlands

sub-discipline of *Archaeology Education* that studies the result of incorporating archaeological concepts and methods into school settings (Corbishley et al. 2008; Franklin and Moe 2012).

We next describe the pedagogical context and theoretical background used to explore how teachers can manage the concept of seascape in their classes when introducing students to the curriculum content about the Amerindians. Following the theoretical section comes an explanation of the methods applied for data collection and the analysis of the results obtained from this case study. Finally, we present our considerations and recommendations for future studies on this topic.

Context of the study

Frequently, archaeology and heritage are associated with the subjects of History, Social Studies, and Citizenship Education (Black 1999; Henson 2000; Copeland 2009). In the Dominican Republic, as in other Caribbean countries, students begin learning about the indigenous inhabitants in primary school as part of the Social Sciences and History curriculum.[1] In the second grade of primary school, the curriculum introduces students to concepts of the lifeways of the *Taíno*, the popular name for indigenous peoples who lived in the island of Santo Domingo.[2] However, the curriculum is vague when detailing the specific cultural practises of these peoples. For example, it does not include discussion of seafaring practices such as canoe building, navigation techniques, or seagoing mythology. Instead, it only mentions that people used canoes to settle the islands. Additionally, primary students are expected to develop their spatial skills by identifying specific islands on a map of the entire Caribbean region. For example, this could include 'the identification of the island of Santo Domingo, location of islands and oceans around it', or products and economic activities in the local community (adapted from the Grade 2, social sciences curriculum primary school level, MINERD 2016a).

In secondary education, the curriculum provides less space for discussing Amerindians and their way of life. Instead, it focuses on the initial encounters with Europeans, colonialism, slavery, and capitalism or more contemporary topics of history and social dynamics, such as migration. It also focuses on the migrations of Amerindians from the northern coast of South America to Hispaniola.

Combined approach

Using a combined approach based on seascape theories and teachers' base knowledge, we studied educators' perceptions of seascapes and the relation with the Amerindian influence on their classroom practices when teaching about indigenous peoples.

Seascapes

Much focus of archaeological scholars studying pre-Columbian Amerindians in the Caribbean has centred on landscapes, or land-based archaeological finds. This is problematic when thinking of connections between Caribbean islands, as many of them were linked through human interaction across the sea, including trade, resource procurement, and even the movement of whole communities between islands. It is important, therefore, to define a counterpoint to landscape archaeology that encompasses the use of the sea and the relationship between the sea and human experience (sensu Dawson 2014). Cooney supposed that:

> Seeing and thinking of the sea as a seascape – countered, alive, rich in ecological diversity and in cosmological and religious significance, and ambiguity – provides a new perspective on how people in coastal regions actively create their identities, sense of place and histories. (Cooney 2003, 325)

Here we chose to focus on the processes of canoe voyaging and the navigation possibilities exploited by early seafarers in the region, which is one aspect of the study of life at sea in the past (e.g. Callahan 2001). Utilizing ideas of inter-island connections as carried out by canoe voyaging,

it may be possible for educators to explain the highly-interconnected lifestyle of Amerindians. The outline of these seascapes could have influenced cultural decision-making, specifically the relationship between sea and land, the location of environmental factors such as winds and tides, reefs and banks, and even the existence of channels (Crouch 2008, 132). Understanding the sea, or seascape, was likely part of daily life for Caribbean Amerindians.

In some cases, we know that Amerindians were more closely linked with people living in villages across island channels than with other communities on the opposite end of their own island (Hofman, Hoogland, and van Gijn 2008). This idea of inter-island and pan-regional connection is as relevant for the study of past communities as it is for Caribbean peoples today. An archaeological approach to seascapes could break down ideas of island boundaries that so often colour the public's understanding of history in the Caribbean but do not actually apply to the study of early Amerindian communities, which were highly mobile between islands (Hofman, Bright, and Rodríguez 2010).

Archaeology provides a unique way for students to learn about the history of Amerindians in the Caribbean and the seafaring technology that was present before Europeans arrived in the region. By tracing movement of objects between communities whose social networks spread over several islands, archaeology illuminates how the fluidity of exchange, aided by canoes, enabled the indigenous peoples to grow and maintain region-wide relationships (Hofman, Bright, and Rodríguez 2010). The archaeological record can help define the limits of these connections as the origins of peoples and of specific goods like pottery, animal bones, and stone tools can be identified through scientific analysis (Hofman, Hoogland, and van Gijn 2008). The final resting place of these objects can also define specific nodes within these networks, as well as identify how using these objects may have influenced the ways in which they were transported between islands (Hofman and Hoogland 2011).

The most important factor in these object exchanges was the canoe itself, without which none of these links could have been established. Canoes also allowed for a relationship between Amerindians and the surrounding seascape, or the water environment that connected these communities and provided a surface for this exchange. Engaging the concept of seascapes in a classroom setting enables discussion of navigation techniques, fishing and other subsistence practices, and inter-island community bonds and social organization. Archaeologically speaking, it clears the way to understanding not only the process of transporting materials but also who was moving them and why.

Applications of seascapes in teaching social studies in light of recent archaeology education endeavours

Caribbean countries have adopted the subject of Social Studies in their school programmes (Howe and Marshal 1999) to promote education in citizenship, democracy and global shifts. In the Dominican Republic, a Spanish-speaking Caribbean country, Social Studies (*ciencias sociales*), integrating History, Culture and Geography, are part of both the primary and secondary school curricula (adapted from the Curricular Design for Primary and Secondary Curriculum MINERD 2016a, 2016b, 2016c).

Because of its overarching goals, the quality of Social Studies education has been the subject of debate. While some support an integrated approach to teaching Social Studies, others argue that maintaining a separation of social studies into history and geography subjects is necessary. Most of these discussions revolve around what teachers of Social Studies should know (Whitson 2004, 10–11).

We focused on a broader concept of teaching beyond the questions of what educators should know to include questions of how they know and how they teach. In this study, we assumed that Social Studies integrates History and Geography components to support the learning of 'location in time and space', 'critical use of the information sources' and the 'social-cultural interaction and citizenship formation', all specific competencies in the study of Social Studies as described in the Curricular Design for Primary and Secondary Curriculum MINERD (2016a, 2016b, 2016c).

Because 'seascape' is a concept involving geographical and historical knowledge that can apply both to the study of past cultures and today's social dynamics, we were interested in exploring its application in Social Studies programmes from a teacher's perspective. Thus, we used contributions of Shulman (1986–1987) that have influenced most contemporary research in teachers' knowledge, especially in Science education (Van Driel, Verloop, and De Vos 1998).

The concept of teachers' knowledge refers to a broad research field seeking to gain insights into teachers' practices by looking at the various labels that represent relevant aspects of this knowledge (Henze, van Driel, and Verloop 2007). It is a theoretical framework for teaching and learning processes that represents what teachers know and how they know, known as Pedagogical Content Knowledge (PCK) and comprises subject matter knowledge; general pedagogical knowledge; curriculum knowledge; knowledge of student's understanding, and contextual knowledge (Shulman 1986, 1987). According to Berry, Loughran, and van Driel (2008, 1272): 'The foundation of PCK is thought to be an amalgam of a teachers' pedagogy and understanding of content such that it influences their teaching in ways that will best engender student's leaning understanding'. As we were interested in exploring what teachers understood of the role of sea travel in the past by evaluating the link between practice and knowledge; we considered that the PCK construct was the most suitable for this endeavour. Our research interest overlaps with recent approaches that seek to provide students and teachers with practical resources to learn about the past through archaeological evidence (Corbishley 2011; Franklin and Moe 2012). Moreover, research efforts in this field use the PCK construct to assess the role of archaeology education in the curriculum and teachers' practices (Black 1999).

Con Aguilar studied how Archaeology Education is reflected within the school curriculum. Her conclusions are similar to those of Black (1999) and Henson (2000), suggesting that Archaeology Education should not be a separate subject in the school curriculum but is intrinsically related to Social Studies. In addition to this, she has found that the PCK construct has also been of use in assessing how teachers of Social Studies envision teaching and learning practices (Griffith 2003). For these reasons, our study benefited from combining the theoretical constructs of seascape theory and teacher's knowledge, as they allowed us to look at Archaeology Education to gain insight in the implications of the concept of sea travel in teachers practice.

There are few studies focused on the current status of archaeology and education in the Caribbean. However, there are various efforts to make archaeological knowledge accessible to local communities, which include teachers and students. Local institutions such as museums and archaeological centres[3] undertake most of these initiatives. For our research we worked in close collaboration with *Museo Arqueológico Regional Altos de Chavón*, a private museum in the town of La Romana with a large archaeological collection of pre-Columbian artefacts. This museum has developed several outreach and educational programmes for the school community to raise awareness of Amerindian heritage.

Methods applied

We conducted this study using the participatory action research approach (PAR) applied within a qualitative framework. PAR allows the researcher and research participants to co-construct knowledge in a collaborative way. Our aim was 'to engage in self- and collective reflection to gain clarity about the issue under investigation' (McIntyre 2008, 1). Therefore, we organized participatory activities, such as workshops, to facilitate teachers' participation in the research process. As a part of these workshops, we used research instruments such as questionnaires to collect data to help us understand what teachers know and how they applied the concept of seascapes in their classrooms.

We used the PAR approach to contribute to teachers' practice and, more specifically, determine how to make adjustments to educational resources in situ with teacher input (Carr and Kemmis 1986; Elliot 1990; Stringer 2010). Incorporating the views of educators can provide valuable information on how to aid professional development (MacDonald 2012). Due to the nature of our research with a small timeframe and limited sample, we did not rely on a probabilistic sampling method

involving large numbers of participants. Instead we targeted a particular group of a wider population (Cohen, Manion, and Morrison 2000), following a purposeful sampling strategy (Patton 1990) allowing for opportunistic sampling that 'permits the sample to emerge during the fieldwork' (Patton 1990, 179). As a result, we selected the groups of teachers that participated in this study with the assistance of our local partners (stakeholders), specifically the correspondent school district authorities, who invited a small non-random group of teachers from primary and secondary education in governmental schools within the Valverde and Montecristi school districts to participate in the workshop *Teaching and Learning Indigenous Heritage* in August 2015.

After defining our sampling population, we collected data applying diagnostic surveys, a form of educational assessment to gauge teachers' understandings of a topic (Brookhard and Loadman 1995).[4] The survey sought to collect teachers' perceptions about seascapes and their connection to the teachers' classes and consisted of one open-ended question and five multiple-choice questions designed to measure a teacher's base knowledge. The questions addressed specific aspects of daily teaching practices: subject matter knowledge; general pedagogy (teaching and learning strategies); student's learning and understanding; curriculum, and educational resources. In addition, we prepared an evaluation survey to determine whether educators felt differently about the teaching of Amerindian seascape differences before and after the presentation and exercises.[5] Due to time-limitations only a small number of participants completed the evaluation survey.

Because of the case study approach and sample size, our study does not aim to produce generalizations, but we can draw conclusions in the conceptual ground concerning pedagogical applications of the concept of sea travel in school lessons.

Data collection

We collected data for this study by using questionnaires to interview Social Science teachers in the Valverde and Montecristi Provinces of the Dominican Republic at both primary school level (students 6–13 years old) and at secondary school level (students 14–17 years old) (UNICEF República Dominicana 2013). As the subject fits within the ecological and environmental concerns associated with water and coastal environments, we also included a few natural science teachers in the study.

Montecristi is on the northwest coast of the island of Santo Domingo (Hispaniola) (Figure 1), surrounded by the sea from the north to the west by the Atlantic Ocean, specifically the bay of Manzanillo and the bay of Montecristi. One can even view a Haitian mountain chain from the beach (Figure 1). Valverde borders the provinces of Montecristi and Puerto Plata. Valverde is also close to water, as it is located a short distance from the beach of La Isabela in the province of Puerto Plata. Both provinces were studied as part of the ERC-Synergy project NEXUS 1492[6] hosted at Leiden University, the Netherlands, which began in 2013 and relies on archaeological prospections and excavations to study Amerindian and European early interactions (Herrera Malatesta 2018; Hofman et al. 2018). One goal of NEXUS1492 is to promote the project's findings to the public and to work in close relations with local schools, which ties closely to the objectives of this paper.

Implementation

We implemented teacher interaction feedback and classroom activities as part of the programme *Teaching and Learning Indigenous Heritage* in August 2015, which we organized in collaboration with the *Museo Arqueológico Regional Altos de Chavón*. In total 42 primary school teachers (28 from Valverde and 14 from Montecristi) and 26 secondary school teachers (17 from Valverde and nine from Montecristi) participated in the workshop.[7] Educators invited to this workshop were primarily in-service or pre-service Social Sciences (primary and secondary school level) teachers, although there were also five Natural Science teachers (four from Valverde and one from Montecristi).
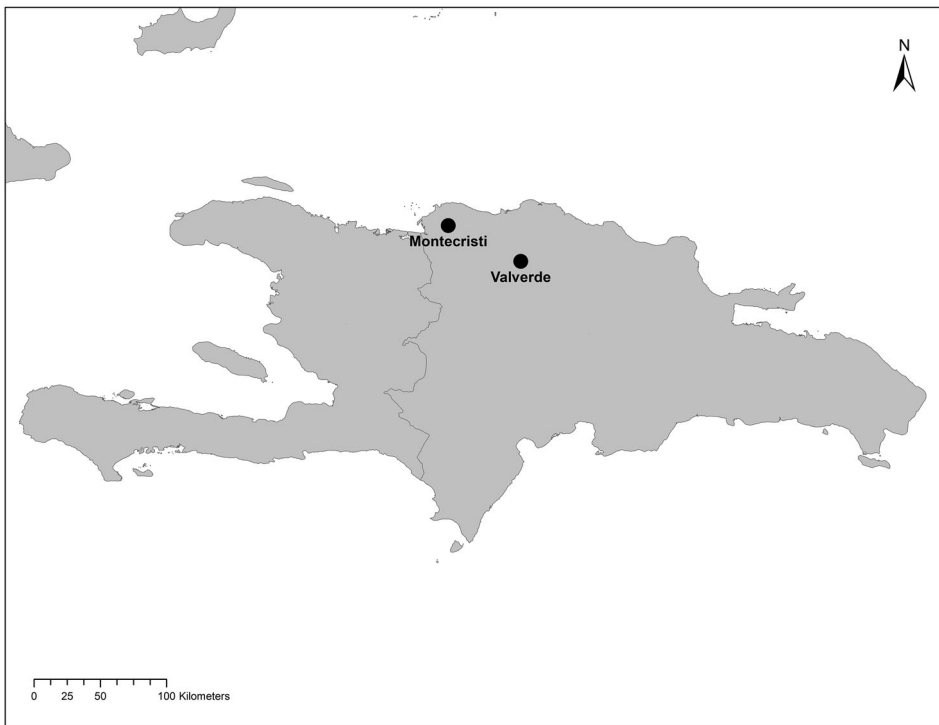
Figure 1. Map showing the island of Hispaniola with the two case study areas highlighted (copyright Emma Slayton).

During the workshop educators had the opportunity to explore the concept of indigenous heritage and how to teach this topic from an archaeological perspective while making connections with existing curriculum guidelines.

We prepared a lecture to provide the teachers with some basics about seascapes, as we were also interested in exploring with them how this concept could be applied in classroom practice. In addition to the lecture on seascapes, we organized participatory activities in which teachers had the opportunity to interact with the educational material (see below) that they could apply in the classroom (Figures 2 and 3). The workshop programme stipulated approximately one hour to focus on the seascapes topic, including applying practical activities. We designed and adapted the resources to the needs of both primary and secondary school teachers. We also asked teachers to complete surveys before and after the activity to assess what previous knowledge they possessed about seascapes, and if their preconceptions on this topic shifted after the workshop. This also allowed us to gain insight into the teachers' perceptions of seascapes and the sea's relationship to the lifeways of Amerindians.

Our goal was to provide teachers with concrete examples of how they could use the idea of seascapes in the classroom and what indigenous pre-Columbian exchange networks needed to function on a regional scale (Con Aguilar, Slayton, and Hofman 2017). We wanted to test the viability of two sets of educational materials, one we designed for primary level and one for secondary level, by allowing educators to complete these exercises themselves. The worksheets also included references to subsistence practices, specifically the collection and exchange of different materials, and evaluated social science reasoning through an environmental and material lens. Our aim was to allow students to situate themselves in a canoe and think about aspects of life with which they would have been in contact. This can include interaction, economics, the formation of family units, as well as valuing objects and relationships. Although focusing on pre-Columbian cultures,

Figure 2. Secondary school teachers of Valverde region presenting their seascapes activity to other peers. (pictures Con Aguilar).

teachers could also use the ideas of inter-island relationships and cross-island social systems to discuss historical examples of how modern Caribbean nations work together.

The two exercises created for this study centred on pre-Columbian Amerindians' use of canoes. We aimed the first worksheet at secondary level students. It required teachers and students to plot out a possible canoe route between several islands. We did this by handing out a map of several Caribbean islands with various resources, representing both subsistence (fishing) and materials (lithic or ceramic resources) consistent with known Amerindian collection areas and sites. To focus these journeys, the exercise required teachers to collect two material resources and visit one sea-based subsistence gathering location before returning to the start point. This also emphasized the connection between sea as a place of transport and as a resource in its own right, which current school literature does not fully

Figure 3. Johnnattan García participant of the workshop, discussing the activity with the rest of the group (pictures Con Aguilar).

discuss. We put the start and end point for the route near the location of both school districts in the Dominican Republic to engage the teachers further.

We asked teachers to trace travel between these points using a scale, where we could correlate a set travel time in knots to a specific distance that they could measure with a ruler. It is possible that actual pre-Columbian canoers travelling along these routes stopped at several islands to engage in trade, visit friends, to rest, or to avoid specific places or peoples. Because re-creating all possible scenarios would have been too difficult to explain to teachers in the time-frame of the workshop, we decided that the teachers should focus on re-creating voyages that moved directly collecting materials. As such, we explained that the goal was to achieve the fastest or most efficient journey possible. We set this parameter to ensure ease of understanding with the teacher participants, whilst acknowledging that this may not have been the way that the Amerindians planned their travels in the past. Having the teachers stick to this guideline was an important step in engaging aspects of the core curriculum, as it involved elements of both geography and mathematics. The handout information also emphasized the role of inter-island connections and choosing where to engage in trade based on distance.

The second worksheet, aimed at primary level students, focused on what could be found in the canoe, in terms of materials, technology, and community. As this exercise was geared towards younger learners, it focused mainly on asking students and teachers to engage with prior knowledge of what they would want to bring with them in the canoe and why. In addition, the worksheet also focused on the canoe's role in maintaining social ties across seascapes as it asked them who might also be in the canoe. This enabled teachers to emphasize the relationship between community and exchange in the past and the present.

Analysis and interpretation

To describe and explore the object of the study, we analysed the survey results following a descriptive statistics approach (Nardi 2006). We present our findings using frequency tables and bar graphs. We grouped the result interpretations following the teachers' base knowledge conceptual input. First, we describe the group of teacher-participants to contextualize the findings. Second, we describe our results related to the subject matter knowledge. Third, we group the results about the knowledge of the seascapes within the curriculum. Finally, we present the results on the use of educational resources and instructional strategies for teaching the concept of sea travel.

Teachers-participants

Of the 68 participating teachers, 57 completed the diagnostic survey: 36 from the Valverde region and 21 from the Montecristi region. Of all respondents from Valverde, 20 were primary and 16 were secondary school teachers. From Montecristi, 14 primary and nine secondary school teachers participated. Twenty-one Montecristi teachers completed the diagnostic questionnaire, while only nine completed the evaluation questionnaire. All Valverde respondents only completed the diagnostic form due to time limitations.

Survey analysis

In order to analyse the results, we first looked at teachers' perceptions of the concept of sea travel. We first evaluated responses to the survey's open-ended question where teachers reflected on the importance of teaching seascapes and its influence in the lifeways of the indigenous peoples in the past. Response codes established the following thematic groups: subsistence; motorway; means of transport; knowledge of the indigenous people, and other. These thematic groups demonstrated that teachers acknowledge the many roles of the sea and its status as an important topic to include in their classes. They felt it helped in the lessons to teach about who past peoples were, and

how they travelled from one place to another using the sea as a 'motorway'. All surveyed educators indicated why they think it is important to teach about the sea and its influence in the lifeways of past indigenous peoples to their pupils.

Educators also selected 'means of transport' as one of the relevant themes to teach about seascapes. Teachers' answers emphasized the mobility of indigenous peoples from one place to another. However, the teachers did not specify what means of transport the Amerindian used for their travels. Only two educators made a specific reference to the canoe as a means of transport:

A) *Sí, porque navegar en canoa en el mar nos refleja el pasado con los indígenas su forma de vide etc.* Survey #16, Valverde, Dominican Republic August 2015.

A) Yes, because canoeing in the sea reflects the past with the indigenous people and their lifeways, etc.

B) *Si porque por medio del mar podían [los indígenas] trasladarse en su medio de transporte la canoa ya fuera para ir de un lugar a otro.* Survey #51 Montecristi, Dominican Republic, August 2015.

B) Yes, because it was the means of transport of the indigenous people to move from one place to another using the canoe.

Most other teachers completing the diagnostic form mentioned the sea as a crucial means of transport, but they did not explain in detail what they meant by this. When speaking of the relationship of the Amerindians with the sea, we observed that educators were more interested in exploring how communities established island networks in pre-Columbian times across the Caribbean. Perhaps most information teachers have available is limited to text books and the curriculum content, emphasizing the migration of the indigenous peoples from the mainland to the islands, rather than the mobility and exchange of goods among the islands (grade 4 Social Sciences curriculum, primary school level, MINERD 2016a).

Beside this specific question on subject knowledge, we asked educators to provide more information about the knowledge of seascapes within the school curriculum. Teachers had to identify specific aspects of the subject matter that could be taught through seascapes. The number of responses was similar for each option of the multiple-choice question sheet, meaning that educators found all options equally relevant for teaching seascapes (Figure 4).
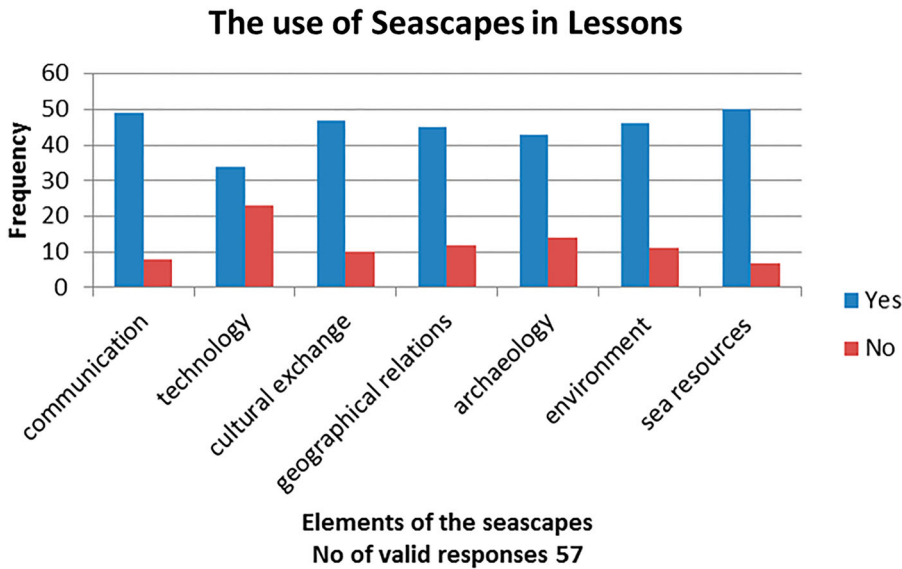

Figure 4. Graph showing a list of elements identified by teachers as useful for studying the sea in classes.

It was evident that all educators identified more than one use of teaching seascapes in their classes. This result, together with the teachers' inputs during the workshop activity, showed that educators perceive seascapes as a rich source of content for teaching multiple aspects of the required Social Science curriculum. However, since only 34 educators selected technology, together with the lack of accuracy in indicating 'canoes' as a means of transport, this indicates that teachers would benefit from more scientific information about the development of technology such as different seafaring techniques and how the sea influenced the lifeways of Amerindians. Educators could then use this information to instruct students in more detail about Amerindian technological skills. For example, students learn that Amerindians used canoes to move from one place to another, but the curriculum does not include specific information about what, how, and why. Adding more archaeological information could help to explain how Amerindians utilized the canoes as a means of transport, and what kind of technological and navigation expertise they required. As these concepts are typically underrepresented in the material known by or provided to the general public, the addition of this information would allow for a more holistic understanding of Amerindian life in the past.

We asked teachers to identify educational resources available to them, and activities they would like to use (Figure 5). Results showed that most teachers identified the internet as a primary source to teach about seascapes (selected 53 times). The teachers also chose photos (51) and the educational toolkit (38) as positive means to teach about Amerindian use of seascapes. It is evident that teachers would favour more visual and enhancing material to teach this topic and to provide examples and clearer references about seascapes that often are limited in the school textbooks.

Most teachers considered the use of more than one educational resource to teach about seascapes, with an average of 3.12 options per respondent. Some teachers described using a globe and compass as additional educational resources (surveys #11 and #13, Valverde, Dominican Republic August 2015), while two other teachers included the use of physical maps (surveys #25 and #26 Valverde, August 2015). One teacher added presentations and videos (survey #27 Valverde, August 2015). Another teacher indicated environments, experienced through outdoor activities (survey #40 Montecristi, August 2015) and finally one teacher mentioned books (survey #51 Montecristi, August 2015).

Educators showed an interest in engaging students with this topic throughout various styles of learning strategies. This is clear in their responses to the question of what kind of activities they would choose to teach the uses of the sea of the Dominican Republic in the past and today. Again, most selected multiple options in their responses, with an average of 4.4 options per respondent. 'Involving local community' was the most popular answer (selected 46 times),
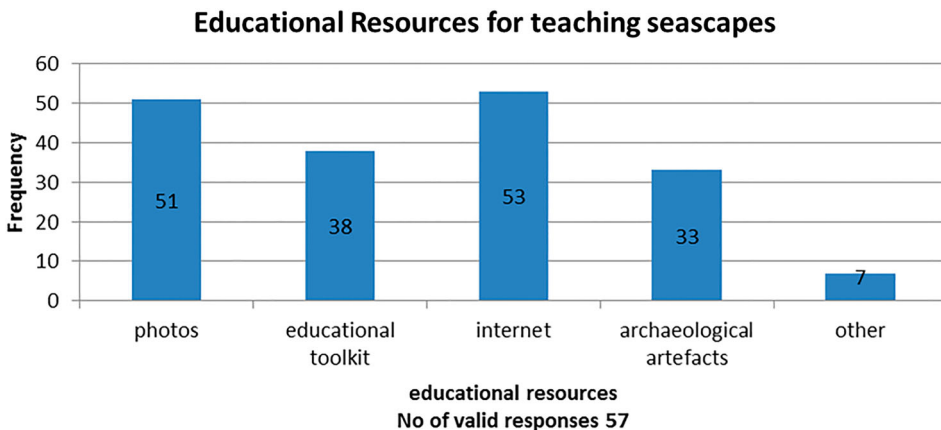
Figure 5. Educational resources relied on teaching seascapes.

Activities identified by the teachers to teach the topic of seascapes

No of valid responses= 57
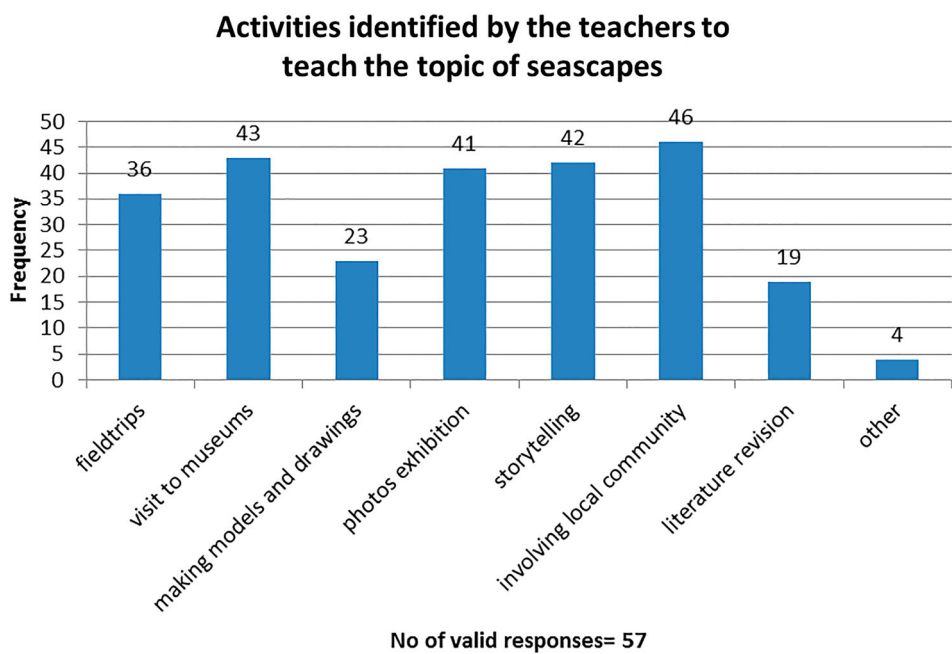
Figure 6. Preferred activities to teach seascapes in their classes.

followed by 'visit to museums' (43 times) and 'storytelling' (42 times) (Figure 6). It is notable that the top three options were not classroom-based activities, but rather involved outdoors learning experiences and establishing connection with the community where the school is located. This result shows the link between teaching how the Amerindians make use of seascapes and heritage education as a framework for designing instructional strategies for teaching this subject. In fact, taking students to explore the school surroundings can enhance the message of the curriculum beyond the classroom. Visiting museums and connecting with the local community[8] (Barlett, Turkanis, and Rogoff 2001) are activities that could encourage pupils to learn about the past by activating their curiosity and interest in historical inquiry (Grever and van Boxter 2011). Thus, these activities can be considered as a practice of outdoor education (Wattchow and Brown 2011), where the students have direct experiences while completing a task connected with their environment but also with the people that are part of it.

Teachers were interested in connecting students with the local community through activities to reinforce the school community (Barlett, Turkanis, and Rogoff 2001). These practical 'hands-on' activities and learning experiences would nurture students' understandings of seascape concepts. For instance, during the workshop some teachers mentioned that people in these regions have an immediate relationship with the sea. Although fishing is not a primary economic activity among the local communities today, some people devote time to it. Fishing, together with salt production and agriculture, is popular, particularly in the provincial capital of San Fernando de Montecristi.

Feedback from teachers

Some of the teachers completed an evaluation form to assess how their understanding of the concept of seascapes and its application in the classroom changed from their initial perceptions reflected in the diagnostic survey. In this way teachers responded to how they felt the workshop informed or changed their ideas about how the sea could have interacted with Amerindian life. As only a small sample of the secondary school educators filled out this evaluation form, the results

are not representative. However, the nine teachers who filled out the form indicated they could see a connection between seascapes and the content they convey in their social science classes. Most importantly for this paper, each of these educators indicated that they understood the concept of seascapes and saw the idea as a beneficial way to engage students in studying Amerindian history. They indicated that they will include the new information about seascapes in their classes as it can serve to expand their students' knowledge about Amerindians and how the sea connects to their heritage and environment.

Only five teachers saw a connection with technology and only three with transport. Based on these results we concluded that there is a need to provide teachers with more scientific information on canoes and how they functioned as transport and facilitators of Amerindian culture. Teachers' answers before and after the workshop showed a need to reinforce the concept of technology, transport, and travel and how these concepts are interconnected. Future workshops could also include background information on navigation techniques and local seafaring legends to bring out aspects of Amerindian culture that were built around seafaring. Additional handouts or activities could educate on the use of the canoe and their carrying capacity, emphasizing the boat's importance in maintaining connections across seascapes through the movement of people and goods.

Limitations

Our study was limited to teachers attending a workshop on strategies for learning and teaching indigenous heritage in the provinces of Montecristi and Valverde in the northwest of the Dominican Republic. Time proved to be an important constraint for applying the programme as designed, and it consisted mainly of a short introduction to the subject of seascapes and the Amerindian life ways and a practical activity. We provided educators with previously designed material and asked them for feedback. We believe that we need to explore teachers' own inputs in the design of the activities in seascapes; and we want to see the teachers apply the designed activities in the classroom and have them report their experiences.

Conclusions

This research, conducted in two separate educational settings in the regions of Valverde and Montecristi, shows that teachers have yet to utilize the concept of seascapes in classes to teach the history of Amerindians way of life in the past in the Dominican Republic. Our results are not intended to establish generalizations that can apply to other school settings. Instead, we expect that this study can serve as a guide for future research in similar topics and teaching methods in other classrooms. We consider that because of the location of our study, it would be worthwhile to study the perception of seascapes in other classrooms across the region.

Applying seascape concepts to this case study involves focusing on the migrations of Amerindians from South America to Hispaniola, which is already part of the Social Science curriculum. We observed that teachers often do not make direct links with the concept of seascapes. It is evident that curriculum does not highlight the role of the sea as a space where people and goods moved in the past. Textbooks emphasize the routes taken by the Amerindians from South America and that these were canoe voyages. But there is no detailed explanation of how Amerindians constructed canoes and what knowledge of seafaring Amerindians had accumulated to overcome the constraints of journeys over the sea. Common misconceptions concerning who the Amerindians were and what kind of technological skills they developed can extend to gaps in understanding their material culture and lifeways.

For this work, we provided teachers with examples of evaluating seascapes as means of transport, but they did not connect that the canoes were the transport that indigenous peoples used for these voyages. The teachers were not very familiar with the idea that the Caribbean Sea was a space of widespread mobility that enabled resources to spread beyond their place of origin. Educators

found the exercises useful as they made them think about the knowledge and tools that the Amerindians needed to move from a place to another in the canoes.

Teachers showed a positive predisposition to know more about seascapes. We observed that the educators in the study found that they could teach seascapes using a variety of instructional strategies, from classroom-based to outdoor activities that involve the local community. Because of our work, we consider that providing a half-day training on seascapes could contribute to teaching in the Dominican Republic and the wider Caribbean incorporating valuable information about how the indigenous peoples in the past communicated with each other and made use of the Caribbean Sea in its vast extension, by developing canoes and navigation techniques to their social studies classes. We were able to corroborate, from the perspectives of teacher participants in this study that teaching about Amerindians from the colonization perspective is still prevalent, with little attention on the more profound layer of the inter-island network that Amerindians established across the Caribbean Sea. This is a cutting-edge theory in Caribbean archaeology studies (Hofman, Bright, and Rodríguez 2010; Hofman and Hoogland 2011; Keegan and Hofman 2017). In this vein, we could see that there is a still a strong disconnect between the information available to teachers and the scientific advances that can inform teachers knowledge and enhance their instructional strategies.

In the future, additional case studies in other Caribbean countries could provide valuable information for designing educational materials. The expanded base for these materials will rely on the impressions from the teachers and how they envision seascapes and their connections with Amerindians in their classroom practice. Along these lines, the authors have put together a set of educational activities on seascapes based on the experience with educators in the Dominican Republic in 2015. The material draws from teacher input and thinking on its application in classrooms and is available on the ERC-Synergy project NEXUS 1492 website (nexus1492.eu).

Additionally, we have invited teacher participants in the workshops organized in the Dominican Republic, as well as workshops in Dominica and St. Kitts-Nevis and all other teachers in the Caribbean region, to make use of this material and to inform us about their experiences in the classroom. We believe that further research in this matter will greatly benefit from field visits to obtain more detailed information of the challenges teachers face when educating students about the subject and using the activities of the seascapes worksheet set. Further participant observation research can provide insights to make educational material more suitable to the needs of both educators and students.

Notes

1. Besides the Dominican Republic, Eldris Con Aguilar also has worked in two other countries and case studies in the Eastern Caribbean: St. Kitts-Nevis in 2014 and Dominica in 2015 and 2016. For her research she has examined the curriculum documents with particular attention paid to Social Sciences. In her dissertation, expected to be published in 2018, she will elaborate in more detail on how the topic of the first inhabitants in the Caribbean is covered in Social Studies and History curricula for primary and secondary level programmes in both case studies.
2. The Taíno are the indigenous people who lived in the Isla of Santo Domingo and the people who Columbus and his crew encountered. This term has been used widely across time to refer to the first inhabitants of these lands. However, the use of the term Taíno is the subject of debate in Caribbean archaeology, as findings are showing that there were various groups of indigenous people rather than a single group under the name of Taíno. For more about the Taíno see Curet 2014.
3. Con Aguilar had the opportunity within her doctoral research to interview and informally discuss with key stakeholders from St. Martin, Saba, Curacao, Aruba, Bonaire, Grenada, and Guadeloupe. She has been able to corroborate the idea that museums and archaeological centres play a key role in orienting efforts to make knowledge about archaeological findings accessible to the community.
4. Diagnostic tests are widely used in educational setting to assess knowledge about a specific subject. In this study, we applied this instrument to test what were teachers' understandings of the topic to be taught, in this case 'indigenous history and heritage'. Ultimately, diagnostic tests sought to identify strengths and deficiencies to deliver contents adequately to the audience learning level. For more information about the role of assessment, testing and evaluation in teacher education see Brookhard and Loadman 1995.
5. The authors translated all responses from the Spanish into English.
6. For more information see https://www.universiteitleiden.nl/nexus1492.

7. From the total of teachers-participants we were able to collect 57 diagnostic surveys.
8. For more information about learning in a school community see Rogoff, Bartlett, and Turkanis (2001).

Disclosure statement

No potential conflict of interest was reported by the authors.

Notes on contributors

Eldris Con Aguilar is a PhD researcher at Leiden University (2013–2017). Her research is part of the ERC-Synergy NEXUS 1492 project. There she studies from a pedagogical perspective teaching practices of indigenous history and heritage from localized examples in Caribbean countries. By focusing on the impacts of the inclusion of heritage values she analyzes its integration within formal and informal educational programmes.

Emma Slayton is a PhD researcher at Leiden University (2013–2017). Her research is a part of the NWO Island Networks project. Her work focuses on re-tracing Pre-Columbian Amerindian canoe routes between Caribbean islands using computer modeling. She is currently one of the organizers of the Leiden University student run Digital Archaeology Group.

Corinne L. Hofman is professor of Caribbean archaeology and directs the Caribbean Research Group at the Faculty of Archaeology, Leiden University. Hofman has carried out archaeological research in the Caribbean since the 1980s. Her primary interests are the communication systems and interaction networks of the indigenous populations in the period before and after the European colonization of the Americas in 1492. Her research is multi-disciplinary and her projects are designed to contribute to the valorization of archaeological heritage in the diverse islandscapes of the Caribbean. Currently, she is corresponding principal investigator of NEXUS 1492, 'New World encounters in a Globalizing World', a synergy project supported by the European Research Council.

ORCID

Eldris Con Aguilar http://orcid.org/0000-0003-3040-3372
Emma Slayton http://orcid.org/0000-0003-2230-3101
Corinne L. Hofman http://orcid.org/0000-0003-4447-5019

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