



The Availability, Utilization and Efficacy of Community Resources in the Teaching and Learning of Science for Knowledge Transfer in Senior Secondary Schools in Akwa Ibom State, Nigeria

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Abstract. The study was examined the availability, utilization and efficacy of community resources in the teaching and learning of science for knowledge transfer in senior secondary schools in Akwa Ibom State, Nigeria. The research design was a descriptive survey. The population for the study was all science teachers from both private and public secondary schools in the State. A total of 480 samples were used. A questionnaire titled “Science Teachers Use of Community Resources in Instructional Delivery (STUCRID) questionnaire was used to collect data for the study. Three research questions and a null hypothesis were formulated to guide the study. Findings revealed that: Private and public secondary schools in Akwa Ibom State lacked most community resources for science delivery, some of the community resources available were not utilized, science teachers’ rating of the efficacy of community resources in instructional delivery was high and there was no significant difference in the use of community resources between private and public secondary school science teachers ($t= 0.130, df=478; p>.05$). It was concluded that for science teachers to be effective in carrying out their instructional functions, there is need to harness and use the abundant resources of the surrounding communities in their teaching.

Keywords: Availability, Utilization, Efficacy of Community Resources, Knowledge Transfer, School Type.

1. Introduction

If effective knowledge transfer is to be achieved through science teaching in this era where entrepreneurial education is greatly emphasized,

there should hardly be a separation between the community and the school. It is in this wise that Dada (2013) maintained that it is impossible to divorce the community from the school. According to him, they are glued together and the aspirations of the community are manifestation of the school system. Sometimes, science teachers complain of availability of instructional materials to teach the students even when the resources are numerous around them. This shows the poor relationship that has existed between the school and the community. Community is endowed with resources

Umeje (2008) in his study on survey and documentation of local resources noticed that there were numerous resources in the community that were not utilized by science teachers in teaching. Thompson (2001) in Edet (2018) maintained that the use of any resources should be governed by the principles of selection and consistency and must be in relation to the experiences of the learner. Such materials are most times found in the community, within and outside the school and they are termed community resources.

According to Ajelabi (2000), community resources are human and non-human resources outside the classroom for the purpose of specific information. Community resources afford the teachers and learners the opportunity to make useful exploitation of the necessary resources present in the community for the purpose of learning and for a better outcome. The outcome may likely help in the transfer of such knowledge into the community based skills for societal benefits. Inyang-Abia (2004) sees community resources to comprise of people, places, things, festivals and ceremonies which are useful for

instructing, educating and training. Every resource in the community is useful and important in impacting knowledge and transfer of such knowledge for improved community based skills.

Community resources are perceived differently by different authors. Mkpa (1989) in Tyokyaa (2017) conceives community resources to mean all the things found within the community outside the confines of the school that could be harnessed and used effectively to facilitate the study of some specific subject matter. It could be conceived as all the opportunities within the community that could be used to expand and enrich the learning experiences of the school. Agunwa (1974) in Tyokyaa (2017) confirms community resources to be the learning laboratory especially of the behavioural sciences. Anwukah (1987) in Tyokyaa (2017) posits that:

The nature of the community largely determines what goes on in the school. Therefore, to attempt to divorce the school from the community is to engage in unrealistic thinking which might lead to policies that could wreck havoc with the school and the lives of children. The community and the school are inseparable.

According to NDDC (2011), community based skills includes but not limited to the following: Crop production and machinery, food preservation, agriculture, livestock (piggeries and poultry), carpentry, welding, blacksmithing etc. It can also include making of sleeping mats, foot mats, among others. Nzewi, Nwosu, Onyegegbu, Nwagbo and Nworgu (2009) see community resources as those teaching and learning resources that can be obtained from the community where the school is located. According to them, this may include persons in the community with specialised knowledge or experience (example are doctors, nurses, agriculturists, welders, and other artisans, industrialists, and research institutions) among others .

Taking students on field trips or using other community resources in their classes is not a new idea for teachers. Often, however, these experiences are thought to be frills or rewards that compete with instructional time in the classroom. Curriculum reform in science and mathematics calls for a new look at using community resources. The national standards in science and mathematics suggest that good programmes require access to the world beyond the classroom so that students will see the relevance and usefulness of science and mathematics both in and out of school (SEDL, 1996). Changing the educational experiences of children by moving beyond the classroom walls can diversify the array of

learning opportunities and connect school lessons with daily life and real problems.

Teachers always face the task of pulling together the diverse understanding their students bring to the classroom. The use of community resources provides a shared memory for the class. For example, going on field trip is only part of the total experience. As students and teachers talk about the trip and think about it after it is over, they are building shared understanding. The event becomes part of the common knowledge of the class and can be referred to in subsequent lessons. What was learned is, thus reinforced and extended in later discussions as the teacher refers to field observations (SEDL, 1996).

Alasela (2013) notes that no effective teaching can take place without instructional materials. Abolade (2009), in Alasela (2013) states that the relevance of making learning and instructional materials to qualify as community resources is its closeness to both teachers and learners. He mentioned community resources to include religious institutions, such as churches, mosques, and shrines; commercial banks, historical places such as Museum and Zoo; industrial sites etc. These are places of interest where students can visit for further explanation on what they have learnt in textbooks. Olelewa, Nzeadibe and Nzeadibe (2014) maintain that availability of educational resources such as time, information, money, material and human capacity makes a school environment conducive to teaching and learning. They further stated that availability of educational resources is very important because of its role in the attainment of educational objectives and goal. It should be noted that the extent to which an educational institution attains her objectives is directly proportional to the educational resources and their utilizations.

Community resources that can enhance mathematics and science learning include science centres to visit (museums, nature centres, interactive science centres, aquaria, gardens and zoos), places to explore that are unique to the local schools (a nearby creek, pond, city street or business), people in the community, or materials that can be borrowed or purchased (SEDL, 1996). Tyokyaa (2015) adapting the collaborative classification of Nicholls and Nicholls (1975) with the classification of Mkpa (1989) categorized community resources into four classes. These are resource personnel, resource places/locations, resource things/materials and resources activities:

Resource personnel: Resource personnel include specialists/professionals, citizens' advisory committees, government representatives, agency

representatives, parents/guardians of students, artisans.

Resource places/locations: Resource places/locations are locations or sites of educational interests which include markets, industrial sites, banks, museums, legislative and other governmental houses or buildings, institutions, professional agency offices or laboratories, workshops, lakes/rivers, farms, mountains/hills, erosion sites, recreational centers, etc.

Resource things/materials: Resource things/materials are all things or materials of educational value within the community which include among others, money, wildlife, water, jewelries, soil, statistical data, minerals, artifacts, tools of work, natural vegetation, motor vehicles, electrical and electronic gadgets, buildings etc and finally

Resource activities: Resource activities include such activities as excursions, field trips, production processes, skills/craft exhibition, banking, marketing, broadcasting, festivals, seminars/symposia, dramatization, role-playing, etc.

The comprehensive categorization of community resources as exposed differently above reveals that there abound adequate relevant community resources that could be mobilized and utilized by teachers to vitalize their teaching and thus make them very effective in the discharge of their duties as teachers. It is in this direction that Mkpa (1989) further asserts that every educational engagement, theory, concept or topic has a resource within the community that could simplify its understanding or make its conceptualization easy. The contentious issue here is for the teachers to identify which community resources will be relevant in teaching which academic subject or topic transferred knowledge. The more the teacher identifies, mobilizes and utilizes the relevant community resource(s) to his advantage, the more effective he is in the discharge of his teaching responsibilities. It is therefore pertinent to state that teachers' effectiveness could be enhanced through harnessing and use of community resources as well as helping the students in knowledge transfer.

Ezeocha (1990) believes that the school exists for the community and the community exists and acts as client to the school. Ezeocha further upholds that the community and the school are two brothers who enjoy mutual benefits as they are crucial in man's struggle for survival in his complex and ever changing society. To Okafor (1988), man's mind is the product of his life experiences and that environmental factors should be given primary consideration in man's upbringing. This underscores

the need to expose the learning materials of the child to the environmental realities around him.

It is important to stress that there is the need to institutionalize peace education and peace culture in our school curriculum as this is essential in harnessing the community realities (resources) to the benefits of the students who upon graduation from the school would be confronted with the practical realities of the socio-cultural, religious, economic, political, and security challenges of the society. Tyokyaa (2017) observed that the Nigerian society today is ravaged with the threats of these vices or challenges and our educational system must not only be tailored towards equipping the students with the theoretical competences of confronting the challenges, they must be practically exposed to the realities by engaging them in the instructional programmes that necessarily harness and use the resources as presented in persons, locations, activities or materials that inherently are components of the community or societal realities (threats). This will bring the students closer to the truth or reality of the world around them. The teachers who engage their students in instructional activities that relate to the resources within the community will also become more efficient and effective in their teaching/learning functions.

The importance of community resources cannot be over emphasized. Functional literacy will continue to elude us without some level of relevant resources available. Hence, it will be extremely difficult for Nigeria to achieve the expected goals without adequate provision and use of resources. Tyokyaa (2017) states that for the teachers to be effective in carrying out his instructional function which aims at equipping learners with appropriate competencies to be useful to the society, he has to harness and use the abundant resources of the community in their teaching. Mkpa (1989) in Tyokyaa (2017) posits that successful teaching and learning is depended upon whether it is society or community oriented. Vande-Guma (2014) upholds that human related discipline are better taught and learnt when related to the concrete resources of the community. Tyokyaa (2017) observes that the teacher who adequately mobilizes and utilizes the resources within the community for his instructional function does not only finds his instructional responsibilities motivating and vitalizing, but optimally finds himself very effective in discharging his instructional responsibilities. It is therefore pertinent to assert that the teachers' effectiveness as well as students' ability to transfer knowledge of what they learn could be enhanced if the teachers use community resources

adequately in discharging their instructional duties. Some of the community resources that may be available for science teaching are hereunder discussed:

1.1 Visit to Science Centres

A learning activity must have a purpose or reason so field trips should be thought of as part of the curriculum. As such, they should provide something to think about as well as something to do or some place to go. If possible, the teacher will want to visit the science centre before the field trip to help him balance the needs of the teaching unit with the resources of the site. The teacher can then focus on those exhibits that demonstrate the concepts being taught and match the students' cognitive levels. Learning activities are prepared for use before, during and after the field trip and include students orientation material, such as a map, a list of exhibits to be visited and the educational objectives of the trip. Students generally find interactive exhibit engaging, these exhibits can be appealing and effective tools for teaching science and mathematics and for generating a positive attitude toward learning these subjects even as the knowledge gained can be utilized in daily activities.

1.2 Outreach

Many students do not live near a zoo, nature center, or museum for a field trip to be practical, but numerous other site offer outreach programmes.

1.3 Use of Available Resources Near the School

The lack of a nearby science centre need not be a limitation. Community resources include unconventional sites, such as the tile factory or a hardware store, fabric store, farm, or ranch. While extended field trips can be rewarding, short school yard trip can be equally valuable. These allow children to discover answers for themselves in a familiar context. Whether your school is urban, suburban, or rural, it reflects the habits of its neighbourhood, the hard-topped surfaces, the soils, grasses, and trees, the weather, and so on. The young inquirer can easily return to the school yard for further data gathering if a question is left unanswered or new questions arise. Bringing the community into the classroom can also involve the following:

1.4 Use of Guidance Materials Through the Mail

By necessity, most learning activities occur in the classroom. Organizations can provide materials that

enrich the curriculum and provide unique experiences for children. These inexpensive or free materials may be overlooked since they are not produced by educational publishing companies. Numerous national organizations have also developed curriculum materials; guidance materials from professional organizations are useful to the workplace.

1.5 Use of Guest Speakers

Guest speakers from the community can provide new information and experiences to students and link the school to the world outside. The teacher should spend time with the guest before the visit so they can discuss the age level of students and kinds of activities and information appropriate for this age group; the needs of the guest during the visit and his or her general comfort level with children; the topic of the presentation and the students' general knowledge about this topic; and what the teacher can do before to make the visit a success. Staff of state agencies such as Nurses, Doctors, National Orientation Agency (NOA) and Ministry of Science and Technology (MOST) can serve as classroom partners or as knowledgeable resources people.

From all the explanations given above, it therefore means that there are natural and human recourses that are inherent in the community which can be used for teaching and learning science which can help in knowledge transfer and are termed community resources. Okpala (2004) in Edet(2018) emphasized that these resources are cheap and affordable to take the cognizance of the students' immediate needs as well as promote students' creativity, self-reliance, interest, motivation and are action oriented. Mezieobi(1991) in Edet (2018) confirms that community resources help to expose students to their realities of their community and also help them have direct experiences which will concretize the learning contents being taught for knowledge transfer.

Bottrel (1957) in Edet (2018) gives three steps that are involved in using community resources in science teaching as thus: finding the resources or exploration, arranging them for use in teaching and learning situations or organisations, and using them in appropriate ways in planning and carrying out science teaching and learning experiences and activities. Dada (2013) sees two methods of utilizing community resources, by taking the students to the community through field trips, school camping etc and by bringing some aspects of the communities to the school through resource persons, financial aids etc. If maximum knowledge transfer is to be

achieved, the above steps can be considered in the use of community resources.

However, according to Nzewi et al (2009), the use of community resources are time consuming, difficult to plan and execute, can cause changes in school activities, expensive if the school is to be taken to the community, among others. Most science teachers have failed to display resourcefulness: they do not connect the learners with available resources even when the resources are within their reach and this can affect students' knowledge transfer for self-reliance and in solving community based problems.

This study is in line with constructivist theory that emphasizes that students construct their own knowledge based on their experiences with their world. The world around the learners is loaded with materials that can help in acquiring necessary knowledge and information that can be individually internalized and converted to the knowledge needed to transform to the society. Hence, community serves as reservoir of resources needed for learning.

It is against this background that this study sought to examine availability, utilization and the efficacy of community resources in the teaching and learning of science for knowledge transfer in both public and private secondary schools in Akwa Ibom State, Nigeria.

2. Statement of the Problem:

The total dependence on high level technological devices such as overhead projectors, shade projectors, visualizers among others in this era where self-reliance and entrepreneurial skills is paramount in instructional delivery in Akwa Ibom state secondary schools is not only unrealistic but may also not give the expected result. Apart from the unavailability of these equipment/materials in some public schools, the effectiveness in usage by some teachers in instructional delivery and the accessibility for the students for knowledge transfer is also questionable. The inadequate exposure of science teachers to the environment in terms of community resources in their teaching has posed a serious problem in the utilization of the knowledge of the learners in their daily needs and in solving community based problems. The problem of this study is therefore to determine the availability, utilization and the efficacy of community resources in the teaching and learning of science for knowledge transfer in both private and public secondary schools in Akwa Ibom State, Nigeria.

3. Purpose of the Study

The main purpose of the study was to determine the availability, utilization and the efficacy of community resources in the teaching and learning of science in senior secondary schools. The study specifically was designed to achieve the following objectives:

- To identify the available community resources for science instructional delivery in senior secondary schools.
- To determine the level of utilization of community resources by science teachers in private and public secondary schools in Akwa Ibom State.
- To examine the efficacy of community resources in instructional delivery of private and public secondary schools in Akwa Ibom State.

4. Research Questions

The following research questions were formulated to guide the study:

- What are the available community resources for instructional delivery in Senior secondary schools?
- How do private and public secondary school science teachers utilize community resources in science teaching and learning?
- What is the efficacy of community resources in instructional delivery?

5. Hypothesis

There is no significant difference in the mean scores of science teachers utilization of community resources in private and public secondary schools in Akwa Ibom State.

6. Methodology

The research design employed was descriptive survey. The target population for the study were all science teachers in all private and public secondary schools in Akwa Ibom State. The sample size for the study was 480 science teachers. 200 from private schools and 280 from public schools. All science teachers in the sampled schools were used in the study. A questionnaire titled: Science Teachers use of Community Resources in Instructional Delivery (STUCRID) questionnaire was used to collect data for the study. The questionnaire consisted of three sections. Section A was on demographic information, section B was on the availability and utilization of community resources in instructional delivery by

Science teachers, while section C was on the efficacy of community resources in instructional delivery process. The questionnaire items in section B and C were constructed using a modified four point likert type scale. In addition to the face validity done by experts in the Department of Science Education, Akwa Ibom State University, Cornbach Alpha

reliability statistics was used to ensure internal consistency which yielded 0.79 reliability coefficient. Data collected were analysed using frequency count, percentage and mean rating statistical tools. Independent t-test was used to test the hypothesis of the study at 0.05 level of significance.

7. Results

Research Question 1: What are the available community resources for instructional delivery in Senior secondary schools in Akwa Ibom State?

Table I: Percentage scores of the available community resources for instructional delivery in senior secondary schools in Akwa Ibom State.

	RESOURCES	Availability (N = 480)			
		Available	%	Not Available	%
1	Museum	-	-	480	100%
2	Nature centres – streams	340	72.9%	140	27.1%
3	Interactive science centres (eg E-Library)	295	61.5%	85	38.5%
4	Aquaria(fish pond)	140	27.1%	340	72.9%
5	Farms (crop farms)	480	100%	-	-
6	Farms (livestock farms)	220	45.8%	260	54.2%
7	Zoo	-	-	480	100%
8	Ranch	10	2.0%	470	98.0%
9	Nearby creek	15	3.1%	465	96.9%
10	Pond	250	52.0%	230	48.0%
11	Business premises(e.g Electronic, GSM etc stores)	480	100%	-	-
12	Industries (Small Scale And Large Scale)	350	72.9%	130	27.1%
13	Institutions (University/ Polytechnic/ Colleges of Education)	380	79.1	100	20.9%
14	Use of Guest speakers from the community (e.g artisans, etc).	150	31.2	330	68.8%
15	Use of professional Guest speakers (Nurses, Doctors, NOA etc).	140	27.1%	340	72.9%

In table 1 only 7 items of community resources were seen as being very much available in the community for instructional delivery. Such items are 2, 3, 5, 10, 11, 12, and 13. Every other items below 50% was rated as not available.

Research Questions 2: How do private and public secondary school science teachers utilize community resources in science teaching and learning?

Table 2: Percentage responses of teachers’ utilization of community resources for instructional delivery in Private and Public Secondary schools in Akwa Ibom State.

	RESOURCES	Percentage of Utilization			
		Public Schools (N= 280)	Private Schools (N = 200)		
1	Museum	-	-		
2	Nature centres - streams	150	53.57%	160	80%
3	Interactive science centres (eg E-Library)	70	25%	150	75%
4	Aquaria (fish pond)	55	19.64%	10	5%
5	Farms (crop farms)	240	85.71%	2	1%
6	Farms (livestock farms)	180	64.28%	2	1%
7	Zoo	-	-	-	-
8	Ranch	10	3.57%	-	-
9	Nearby creek	15	5.36%	-	-
10	Pond	12	4.29%	10	5%
11	Business premises(e.g Electronic, GSM etc stores)	220	78.57%	180	90%
12	Industries (Small Scale And Large Scale)	28	10%	140	70%
13	Institutions (University/ Polytechnic/ Colleges of Education)	250	89.28%	170	85%
14	Use of Guest speakers from the community (e.g artisans, etc).	45	16.07%	65	32.5%
15	Use of professional Guest speakers (Nurses, Doctors, NOA etc).	34	12.14%	32	16%

Table 2 shows teacher utilization of community resources in instructional delivery process. The table reveals that the available community resources utilized in the public secondary school include the items on 2, 5, 6, 11 and 13 while items 2, 3, 11, 12, and 13 were utilized in the private secondary schools.

Research Questions 3: What is the efficacy of community resources in instructional delivery?

Table 3: Mean responses of teacher on the efficacy of community resources in instructional delivery in Private and Public Secondary schools in Akwa Ibom State.

S/N	Items	Mean	Standard Deviation	Decision
1	The use of community resources makes the lesson more interesting.	3.12	1.58	A
2	Community resources make students retain more as they are manipulating known materials.	4.44	1.04	A
3	It makes teaching real and less boring and more rewarding to students	2.88	1.47	A
4	Evaluation of teaching through the use of community resources is easier.	3.50	1.42	A
5	The use of community resources reduces much talking by the teacher but makes teaching more effective	1.16	2.30	D
6	The process is student-oriented in nature.	3.50	1.42	A
7	It is effective for problem solving and knowledge transfer.	2.84	1.60	A
8	It helps in using the natural setting of the community in bringing students into the real life challenges in science	3.39	1.40	A
9	It will help the students to use the events in the community to explore more pervasive and useful science process skills.	3.33	1.54	A
10	It will provide an activity based science learning environment for students to understand the accepted community-science related values.	2.56	1.53	A
11	It will help open formal learning to wider range of cultural experiences in relation to science.	2.09	1.34	D
12	It will enhance effective school and community relationships.	2.17	1.36	D
13	It will help the students to fit their learning to community values, norms and cultural practices and relate them to scientific practices.	2.16	1.38	D
14	It encourages students' interaction with adults in the community, this gives students opportunity to reassess what they know and develop the flexibility necessary to cope with the rapidly changing world.	2.84	1.60	A
15	It will equip students with the skills to promote and sustain youth participation in community based skills for community development.	2.83	1.46	A

*A – Agree, D – Disagree, *Criterion mean – 2.50, weighted mean= 2.71

Table 3 shows teachers mean responses on the efficacy of community resources. The teachers agree on items number 1,2,3,4,6,7,8,9,10,14 and 15 as the efficacy of community resources. While items 5, 11, 12, and 13 were disagree as the efficacy of community resources.

Table 3 further showed that weighted mean score of 2.71 out of the maximum 4.00, is higher than the criterion mean of 2.50. This implies that science teachers' rating of the efficacy of community resources in instructional delivery was high.

Hypothesis: There is no significant difference in the mean scores of science teachers' utilization of community resources in private and public secondary schools in Akwa Ibom State.

Table 4: Independent t-test analysis of teacher utilization of community resources in private and public secondary schools in Akwa Ibom State.

School Type	N	Mean	Std. Deviation	df	t-cal	t-crit
Public Schools	280	30.85	4.039	478	.130	.467
Private Schools	200	30.78	4.008			

*significant at P< .05; df= 478

The result in table 4 reveals a non-significant outcome (t=0.130, P > 0.05). This implies that the observed difference between public school and private school science teachers' utilization of community resources is not statistically significant. Hence the null hypothesis of no significant difference of the mean score of science teachers utilization of

community resources in teaching and learning is retained.

8. Discussion of findings

Table I showed that out of fifteen outlined community resources for instructional delivery, only seven were recorded as being much available for the

teaching of science in both private and public secondary schools in Akwa Ibom State, Nigeria. This finding probably is the reason for poor performance in science subjects in secondary schools in Akwa Ibom State, Nigeria. This finding supports the assertion by Alasela (2013) that no effective teaching can take place without instructional materials. In support of this, Olelewa, Nzeadibe and Nzeadibe (2014) maintained that availability of educational resources makes a school environment conducive to teaching and learning.

Table 2 showed that out of fifteen outlined community resources, only 2, 5, 6 and 11 were utilized by public schools science teachers while only 2, 3, 11, 12 and 13 were utilized by private school science teachers. This accounts for poor interest and performance in science at the secondary school level. This is why Ajelabi (2000) adds that extending the classroom into the community can make the learning of science concepts functional, relevant, significant and experiential. Mezieobi (1991) in his study found out that community resources help to expose students to the realities of their community and also make them have direct experience which will concretize the learning content being taught. This is supported by Umeje (2008) who in his study on survey and documentation of local resources noticed that there were numerous resources in the community that were not utilized by science teachers in teaching.

Table 3 showed that science teachers agreed on eleven items out of fifteen as being the efficacy of community resources in the teaching of science concepts. It is based on the level of efficacy of these resources that Umeje (2008) states clearly that teachers should make use of the available natural and artificial resources in the environment to connect students to the realities of their community and make them have direct experiences with what is taught.

Table 4 showed that there was no significant difference in science teachers' utilization of community resources in both private and public secondary schools in Akwa Ibom State, Nigeria. This shows that it will be extremely difficult for Nigeria to achieve the expected educational goals without adequate provision and use of resources in schools.

9. Conclusion

Having realised the importance of community resources in linking the school with the community for knowledge -transfer in science teaching and learning, teachers must be encouraged, supported and finance to expose the students to the opportunities

available in the community by linking the theoretical components of their teaching/learning programmes with the practical realities expressed in the resources of the community.

10. Recommendations

Based on the findings in this study, the following recommendations are made:

- Science teachers should be encouraged in linking the school to community. It could be done by engaging the students in education tours to sites, and locations as well as inviting professionals, technocrats and even artisans to teach or demonstrate some skills to students in the school.
- Cordial school-community relationship must be encouraged as this will bring about relational activities between the school and the community.
- The management of both private and public secondary schools in the State should formulate policies that will encourage the use of community resources in their schools.

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