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Assessment of web-based learning (WBL) techniques in attaining instructional objectives in higher institutions in Rivers state, Nigeria

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Abstract
The techniques and processes the teacher teach and the learner also learn are conducted, like many other human endeavours, are taking a new approach since the introduction of educational technologies in schools. The old traditional less-flexible ways of teaching and learning have largely replacing with Web-based learning (WBL). Web-based or e-learning is a learning technique that uses a variety of technologies such as the Internet to teach the learner. This technique of learning has gained popular acceptance in many educational enterprises in many developed and developing countries, including Nigeria. Web-based learning provides the learner with opportunity to enjoy some levels of independence from the teacher. Such online learning as it is known among teachers allows learning to be practiced anywhere and any place, with the learner in control of his/her learning schedule. The introduction of WBL brings to educational institutions a significant change in teaching/learning, and thus in the achievement of learning outcomes. This promise has compelled many educational and training enterprises, especially universities to leverage on and integrate the WBL in their system to provide wider access to their curriculum beyond their confined host communities. How far the State owned universities have adopted this new technique has become a question that requires answer? This study attempted to provide an empirical assessment of the extent the two public funded universities in Rivers State have explored and integrated WBL technique in attaining their instructional objectives.

Keywords: Web-Based learning tools, e-Learning assessment, instructional objectives

Introduction
Web-based Learning tools constitute learning via electronic technology, including the Internet, intranets, satellite broadcasts, audio and video conferencing, bulletin boards, chat rooms, webcasts, and CD-ROM. Web-based learning techniques also encompass related terms, such as online learning that only include learning that occurs via the Internet, and computer-based learning that are restricted to learning through the use of computers. E-learning is synonymous with Web-based Learning and has largely replaced it in schools and industry as the term of choice (Reeves & Jonassen, 2016) [9]. Web-based learning holds the promise of substantially transforming the way learning takes place because of its numerous advantages. Among these, Web-based learning fosters greater accessibility to learning by offering anytime and anywhere delivery. It is readily adoptable in both large and small groups since it can accommodate larger numbers of learners at little extra cost and smaller groups of learners that otherwise would not be able to participate in traditional classroom institutions for lack of enrollments (Loveless, 2003) [6]. Further, the content of Web-based learning courses, especially those that are delivered online, can be centrally developed and updated whenever the need arises; therefore, the cost of replacing outdated course materials and retraining teachers and instructors drops significantly. From the learners' point of view, Web-based learning can be self-paced and matched to the learner's needs, and, building on pedagogy that emphasizes the merits of discovery learning, it offers the prospect of promoting greater comprehension and retention, particularly for complex materials, because of its clear opportunities for the hands-on manipulation of course materials and the use of simulations and game-playing. Perhaps for these reasons, Web-based Learning has

witnessed marked growth in the training marketplace in government, industry, and in particular education (Oliver, 2010) [8].

At the same time, Web-based learning is not without its challenges in higher institutions. Among the most important of these is the "digital divide," caused by low computer literacy rates and lack of access to technology among some learner populations in higher institutions in Rivers State. Additional challenges include "social loafing," characterized by students who work less diligently than they otherwise might, or who become frustrated by course material or technology and thus less engaged, because of the relative absence of instructor learner and learner-learner interaction. Further, some Web-based learning tool has been characterized by high attrition rates among learners in higher institutions. Course developers face their own challenges, as they grapple with problems related to technological incompatibility, and they must be certain to make appropriate accommodations to promote access for learners with disabilities. Finally, in the view of Wheeler (2011) [13], web-based learning still lacks credibility. Some employers and academics still view Web-based learning instruction as less credible than traditional face-to-face instruction and may be less likely to hire someone with a Web-based learning qualification unless provided by an accredited institution of higher learning.

Although these benefits and challenges apply in a general sense, Web-based learning tools in fact is an umbrella term that encompass multiple delivery modes and methods, with each having particular strengths given certain contexts and learning objectives. In addition, web-based learning can be synchronous, where delivery occurs when instructors and learners meet at a specific time in a physical or virtual classroom, or it can be asynchronous, when the learning does not occur at a pre-specified time and thus can be self-paced. Further, Smeets (2005) [11] opined that different applications can be predominately instructor-centric, which have an expert at the core who delivers a lecture, either synchronously or as an asynchronous narrated tutorial; or they can be content-centric, where learners interact with content that is embedded in a learning system and experience little instructor-learner or learner-learner interaction; or they can be learner-centric, where the learner is the navigator, the learner's interests and needs drive the learning, and the learning environment is open. In actuality, much Web-based learning mixes these different methods and modes. Furthermore, Grabe and Grabe (2007) [3] opined that web-based learning techniques are increasingly seen as being most effective when it is used in concert with, rather than as a replacement for, more traditional face-to-face instruction, in a style that has come to be known as blended learning (Lim & Hang, 2003) [5]. Given the promise of Web-based learning techniques, it is not surprising that their applications have increasingly been seen in government, industry, and education. For example, in 1997 the Department of Defense initiated Advanced Distributed Learning (ADL), a comprehensive strategy to integrate technology and learning content to further the department's training efforts. In industry, blended learning that incorporates strategies for diverse learning styles was embraced, including a web-based On-Demand Model with just-in-time learning embedded in the workflow as well as traditional face-to-face classroom sessions. Web-based learning has also been used in K-12, post-secondary, and adult education (Moore & Kearsley, 2016) [7]. In fact, most post-secondary institutions now offer distance learning, either as selected courses offered online as part of traditional on campus programs or as entire certificate, undergraduate, and graduate programs offered primarily or solely online in attaining instructional objectives in higher institutions.

In the view of Harris (2012) [4], with the widespread adoption of Web-based learning techniques measuring their effectiveness has become more of a priority. Different facets of evaluation include measuring learners' satisfaction with the experience, measuring their skill gains through pre- and post-tests (sometimes in comparison to learners who received traditional classroom approaches), gauging how learners applied their new knowledge in work settings, and estimating how the institution itself benefited from employee learning. In return-on-investment calculations, the latter entails an assessment of whether the benefits are commensurate with the cost of providing the training (Sharma, 2013) [10].

Although rigorous wide scale research evaluating Web-based learnings' effectiveness by any of these criteria are sparse, the available evidence seems to suggest that Web-based Learning generally seems to work at least as well as traditional approaches and is often less costly. Nonetheless, it also seems clear that, to realize its full potential, Web-based Learning should not dispense with opportunities for human interaction (either face-to-face or electronically), and that it should provide opportunities for the active engagement of learners, provide content that is relevant and linked with what learners already know, and offer opportunities for feedback and support (UNESCO, 2012) [12].

Wong (2013) [14] stated that what is clear as well is that Web-based learning is rapidly evolving in adopting these principles, as new technologies emerge and old ones fall out of favour, as training designers and educators learn how to use these tools to increasingly improve the attainment of educational objectives in higher institutions of Rivers State. In the assertion of Zhao and Cziko (2011) [15], educational objectives describes the goals toward which the education process is directed. When drawn up by an education authority or professional organization, objectives are usually called standards. Objectives for learning can be grouped into three major domains: cognitive, affective and psychomotor. The latter consists of small units of instructional content that can be assembled, reused, and rearranged for use in multiple lessons and courses. Therefore, the study intended to provide an assessment of web-based learning techniques in attaining instructional objectives of higher institutions in Rivers State.

Purpose of the study: The purpose of the study was to provide an assessment of some web-based learning techniques in attaining instructional objectives in higher institutions in Rivers State. Specifically, the study sought to:

1. Find out the various ways in which web conferences are utilized to enhance the attainment of instructional objectives in higher institutions in Rivers State.
2. Investigate the various ways in which online forums are utilized to enhance the attainment of instructional objectives in higher institutions in Rivers State.
3. Determine the various ways in which satellite broadcasts are utilized to enhance the attainment of

instructional objectives in higher institutions in Rivers State.

Research questions: The following research questions were raised to guide the study:

1. In what ways are web conferences utilized to enhance the attainment of instructional objectives in higher institutions in Rivers State?
2. In what ways are online forums utilized to enhance the attainment of instructional objectives in higher institutions in Rivers State?
3. In what ways are satellite broadcasts utilized to enhance the attainment of instructional objectives in higher institutions in Rivers State?

Hypotheses

The following research hypotheses were formulated to guide the study and tested at 0.05 alpha level.

1. There is no significant difference in the opinions of students in Rivers State University and Ignatius Ajuru University of Education on how web conferences are utilized to enhance the attainment of instructional objectives in higher institutions in Rivers State.
2. There is no significant difference in the opinions of students in RSU and IAUE on how online forums are utilized to enhance the attainment of instructional objectives in higher institutions in Rivers State
3. There is no significant difference in the opinion of students in RSU and IAUE on how satellite broadcasts are utilized to enhance the attainment of instructional objectives in higher institutions in Rivers State.

Methodology

The research adopted the descriptive survey research design. The population of the study was 345 undergraduate students in Computer Science Department (Year One) which comprised of 191 from Rivers State University and 154 from Ignatius Ajuru University of Education in 2018/2019 academic session. A sample size of 183 was drawn from the population using the Fluid Survey Sample Calculator. The simple random sampling technique was adopted for this study. A structured questionnaire titled "Web-based learning techniques and Instructional Objectives (WEBLIO) which has a four point rating scale was designed to elicit information from the respondents. The instrument was content and face validated by two experts in the fields of Computer Science and Educational Measurement and Evaluation, while a reliability coefficient value of 0.77 was obtained using the Pearson's Product Moment Correlation. Mean and Standard Deviation were used to answer the research questions, while Z-test Analysis was used in testing the null hypotheses at 0.05 alpha level.

Results

Research question 1: In what ways are web conferences utilized to enhance the attainment of instructional objectives in higher institutions in Rivers State?

Table 1: Mean and Standard Deviation of how web conferences are utilized to enhance the attainment of instructional objectives in RSU and IAUE in Rivers State.

S/N	Questionnaire Items	IAUE(102) X	SD	Rmks	RSU (82) X	SD	Rmks
1	Web-based conferences provides for quick delivery of lessons	2.75	1.40	Agreed	2.81	0.99	Agreed
2	Web-based conferences offers access to updated content.	2.89	1.52	Agreed	3.11	0.79	Strongly Agreed
3	Web-based conferences provides for desktop and application sharing.	2.74	1.99	Agreed	2.60	1.86	Agreed
4	Web-based conferences makes communication easy.	2.41	1.28	Agreed	2.79	1.48	Agreed
5	It improves the relationship among students.	2.44	1.59	Agreed	3.22	1.76	Strongly Agreed
6	Web-based conferences conduct students training easily.	2.29	1.47	Agreed	2.51	1.30	Agreed
7	With web-based conferences students are no longer constrained from distance learning.	2.19	1.23	Agreed	2.59	1.53	Agreed
8	It is used to drive learning closer to the students.	2.50	1.30	Agreed	3.44	1.61	Strongly Agreed
9	Removes geographical limitations.	3.20	1.45	Strongly Agreed	3.22	1.75	Strongly Agreed
10	Improves social learning experiences.	3.11	1.62	Strongly Agreed	3.54	1.93	Strongly Agreed
11	It gives students the opportunity to host webinars	2.66	1.43	Agreed	2.61	1.25	Agreed
12	Improves students' collaboration.	2.90	1.93	Agreed	2.05	0.49	Agreed
13	Web-based conferences provide certain individual learning preferences.	2.74	1.28	Agreed	2.68	1.70	Agreed
14	Provides flexible support solution.	3.08	1.13	Strongly Agreed	2.32	1.64	Agreed
15	Streamlines students' review process.	2.73	1.50	Agreed	2.80	1.67	Agreed
	Grand Score	2.64	1.47	Agreed	2.75	1.45	Agreed

From the table above, the grand mean score of 2.64 and a standard deviation of 1..47 was gotten from the students, while the grand mean score of 2.75 and a standard deviation of 1.45 was gotten from the lecturers. These responses agreed that web conferences enhances the attainment of educational objectives of higher institutions in Rivers State.

Research Question 2: In what ways are online forums utilized to enhance the attainment of instructional objectives in higher institutions in Rivers State?

Table 2: Mean and Standard Deviation of how online forums are utilized to enhance the attainment of instructional objectives in higher institutions in Rivers State.

S/N	Questionnaire Items	IAUE(102) X	SD		Rmks		RSU (82) X SD
16	Online forums generates fresh content.	3.15	2.15	Strongly Agreed	2.45	1.24	Agreed
17	Online forums improves students' experiences to website.	2.59	0.88	Agreed	2.67	1.31	Agreed
18	Online forums enhances students' retention.	3.11	0.93	Strongly Agreed	2.80	1.18	Agreed
19	Online forums makes students to be in direct contact with one another.	2.14	1.80	Agreed	2.21	1.41	Agreed
20	The forums are ideal in creating meaningful relationship among students.	2.20	1.73	Agreed	2.80	1.30	Agreed
21	Provides the means of sharing information.	3.45	1.57	Strongly Agreed	2.51	1.15	Agreed
22	Streamlines communication.	3.76	1.64	Strongly Agreed	2.72	1.68	Agreed
23	Earn students' knowledge using ads, subscription fees and donations.	2.96	1.29	Agreed	2.55	1.48	Agreed
24	Boost search engine rankings.	2.17	1.66	Agreed	3.22	1.63	Strongly Agreed
25	Online forums build trust	3.04	1.03	Strongly Agreed	3.61	1.34	Strongly Agreed
26	It drives loyalty.	3.51	2.01	Strongly Agreed	2.50	1.33	Agreed
27	Online forums provides feedback for the students.	3.56	1.93	Strongly Agreed	2.23	1.09	Agreed
28	Improves students' activities.	2.53	1.60	Agreed	2.67	1.38	Agreed
29	Enhances critical thinking.	2.89	1.87	Agreed	3.00	1.12	Strongly Agreed
30	Increases interaction time.	2.00	1.21	Agreed	2.43	1.34	Agreed
	Grand Score	2.80	1.55	Agreed	2.62	1.33	Agreed

From the table above, the grand mean score of 2.80 and a standard deviation of 1.55 was gotten from the students, while the grand mean score of 2.62 and a standard deviation of 1.33 was gotten from the teachers. These responses agreed that online forums enhances the attainment of instructional objectives in higher institutions in Rivers State

Research question 3: In what ways are satellite broadcasts utilized to enhance the attainment of educational objectives of higher institutions in Rivers State?

Table 3: Mean and Standard Deviation of how satellite broadcasts utilized to enhance the attainment of instructional objectives in higher institutions in Rivers State.

S/N	Questionnaire Items	IAUE(102) X	SD		Rmks		RSU (82) X SD
31	Satellite broadcasts is used for mobile and wireless communication.	3.20	1.90	Strongly Agreed	2.95	1.29	Agreed
32	It provides wider bandwidth base on allocation types.	2.19	2.01	Agreed	2.13	1.31	Agreed
33	Satellite broadcasts is easy to install and manage the ground station sites.	3.33	1.71	Strongly Agreed	2.49	1.23	Agreed
34	It does not incur much of the costs per VSAT site	2.11	2.00	Agreed	2.22	1.31	Agreed
35	It is used to obtain service from one single provider and uniform service is available.	3.48	1.80	Strongly Agreed	2.41	1.52	Agreed
36	Satellite broadcasts is used in wide variety of applications.	3.52	1.42	Strongly Agreed	2.75	1.22	Agreed
37	Satellite broadcasts is used in intelligence gathering.	3.20	1.87	Strongly Agreed	2.34	1.08	Agreed
38	Satellite broadcasts is used in global mobile communication.	3.12	0.84	Strongly Agreed	2.86	1.78	Agreed
39	It connects remote areas.	2.99	0.71	Agreed	2.28	1.03	Agreed
40	Satellite broadcasts requires less time.	3.06	0.92	Strongly Agreed	3.17	1.24	Strongly Agreed
41	Satellite broadcasts provides sound quality in broadcast.	3.37	1.93	Strongly Agreed	2.56	1.43	Agreed
42	Provides commercial free listening.	3.29	0.79	Strongly Agreed	2.88	1.30	Agreed
43	Satellite broadcasts provides versatility of connections with signals obtainable on many internet connected devices.	3.11	0.95	Strongly Agreed	2.78	1.82	Agreed
44	Offers information about traffic and weather conditions.	2.89	1.27	Agreed	3.03	1.23	Strongly Agreed
45	Satellite programs are not interrupted by	3.44	1.22	Strongly	2.58	1.40	Agreed

	commercials.			Agreed			
	Grand Score	3.08	1.42	Strongly Agreed	2.50	1.35	Agreed

From the table above, the grand mean score of 3.08 and a standard deviation of 1.42 was gotten from the students, while the grand mean score of 2.50 and a standard deviation of 1.35 was gotten from the teachers. These responses agreed that satellite broadcasts enhances the attainment of instructional objectives in higher institutions in Rivers State.

Test of Hypotheses

HO_1:

There is no significant difference in the opinion of students in Rivers State University and Ignatius Ajuru University on how web conferences are utilized to enhance the attainment of instructional objectives in higher institutions in rivers state.

Table 4: Z-test of the difference in the opinion of students on how web conferences are utilized to enhance the attainment of instructional objectives in higher institutions in Rivers State.

Group	$\bar{X}$	SD	N	Df	z-cal	z-crit
IAUE	4.09	3.21	102			
				181	0.92	1.96
RSU	3.44	4.83	81			

P< 0.05

Since the calculated z-value of 0.76 is less that the critical value of 1.960, it is imperative therefore to state here that the null hypothesis which states that there is no significant difference in the opinion students on how web conferences are utilized to enhance the attainment of instructional objectives in higher institutions in Rivers State is accepted and the alternate is thus rejected.

HO_2: There is no significant difference in the opinion of students in RSU and IAUE on how online forums are utilized to enhance the attainment of instructional objectives in higher institutions in Rivers State

Table 5: Z-test of the difference in the opinion of students on how internet are used and applied for achieving quality instructional objectives in higher institutions in Rivers State.

Group	$\bar{X}$	SD	N	Df	z-cal	z-crit
IAUE	4.09	3.21	102			
				181	0.92	1.96
RSU	3.44	4.83	81			

P< 0.05

Since the calculated z-value is 0.92 while the critical value is 1.960 showing that the z-calculated is less than the table value. It is incumbent on the researcher to state that the null hypothesis is accepted. Therefore there is no significant difference in the opinion of students on how online forums are utilized to enhance the attainment of instructional objectives in higher institutions in Rivers State.

Hypothesis 3: There is no significant difference in the opinion of students in RSU and IAUE on how satellite broadcasts are utilized to enhance the attainment of instructional objectives in higher institutions in Rivers State.

Table 6: Z-test of the difference in the opinion of students on how satellite broadcasts are utilized to enhance the attainment of instructional objectives in higher institutions in Rivers State.

Group	$\bar{X}$	SD	N	Df	z-cal	z-crit
IAUE	4.80	4.26	102			
				181	1.01	1.96
RSU	3.20	4.23	81			

P< 0.05

Since the calculated z-value is 1.01 while the critical value is 1.960 showing that the z-calculated is less than the table value. It is incumbent on the researcher to state that the null hypothesis is accepted. Therefore there is no significant difference in the opinion of students on how satellite broadcasts are utilized to enhance the attainment of instructional objectives of higher institutions in Rivers State.

Discussion of findings

One of the major findings of this study was that there is no significant difference in the opinion of students on how web conference are utilized to enhance the attainment of instructional objectives in higher institutions in Rivers State. This finding is in line with the view of Smeets (2005) [11] that the utilization of web conferences as a subject of information and communication technology can help revitalize lecturers and students in the attainment of instructional objectives in higher institutions in Rivers State. This can help to improve and develop the quality of education by providing curricular support from several areas. To achieve these objectives, lecturers are obliged to be involved in collaborative projects and development of intervention strategies, which would include teaching partnerships with ICT as a tool. Wong (2013) [14] stated that what is clear as well is that web-based learning is rapidly evolving in adopting these principles, as new technologies emerge and old ones fall out of favour, as training designers and educators learn how to use these tools to increasingly improve the attainment of instructional objectives in higher institutions of Rivers State. In the assertion of Zhao and

Cziko (2011) [15], recent trends include the gravitation towards online delivery and the adoption of Learning Objects. According to Zhao and Cziko (2011) [15], there are three fundamental conditions for teachers to introduce ICT into their classrooms: teachers should believe in the effectiveness of technology, teachers should believe that the use of technology will not cause any disturbances, and finally teachers should believe that they have control over technology. In contrary, Smeets (2005) [11] preserved that most lecturers do not make use of the potential of web conferencing to contribute to the quality of their learning environments which is common in our society today.

It was also found that there is no significant difference in the opinion of students on how online forums are utilized to enhance the attainment of instructional objectives in higher institutions in Rivers State. With the help of online forums, learners will browse through several electronic means, such as; e-books, sample examination papers, previous year papers etc (Bell, Reddy, & Rainie, 2004) [1]. Online forums as an indices of ICT learning tools also provides for academic institutions to reach poor groups and new international educational markets. As well as learning at any time, lectutrers are also finding the potentials of teaching at any time to be opportunistic and able to be used to advantage. Thus, ICT enabled education will ultimately lead to the democratization of education (Zhao & Cziko, 2011) [15]. Although rigorous wide scale research evaluating web-based learnings' effectiveness by any of these criteria is sparse, the available evidence seems to suggest that Web-based learning generally seems to work at least as well as traditional approaches and is often less costly. Nonetheless, it also seems clear that, to realize its full potential, web-based learning should not dispense with opportunities for human interaction (either face-to-face or electronically), and that it should provide opportunities for the active engagement of learners, provide content that is relevant and linked with what learners already know, and offer opportunities for feedback and support (UNESCO, 2012) [12].

Finally it was found that there is no significant difference in the opinion of students on how satellite broadcasts are utilized to enhance the attainment of instructional objectives in higher institutions in Rivers State. This finding provides that given satellite broadcasts as a scale factor of web-based learning style, it is not surprising that its applications have increasingly been seen in government, industry, and education. For example, in 1997 the Department of Defense initiated Advanced Distributed Learning (ADL), a comprehensive strategy to integrate technology and learning content to further the department's training efforts. In industry, blended learning that incorporates strategies for diverse learning styles was embraced, including a web-based On-Demand Model with just-in-time learning embedded in the workflow as well as traditional, face-to-face classroom sessions. Web-based learning has also been used in K-12, post-secondary, and adult education (Moore & Kearsley, 2016) [7]. In fact, most post-secondary institutions now offer distance learning, either as selected courses offered online as part of traditional on campus programs or as entire certificate, undergraduate, and graduate programs offered primarily or solely online in attaining educational objectives of higher institutions (Harris, 2012) [4].

Conclusions

Web-based learning techniques constitutes learning via electronic technology, including the Internet, intranets, satellite broadcasts, audio and video conferencing, bulletin boards, chat rooms, webcasts, and CD-ROM. Web-based learning tools also encompasses related terms, such as online learning that only include learning that occurs via the internet, and computer-based learning that is restricted to learning through the use of computers. E-learning is synonymous with web-based learning and has largely replaced it in scholarship and industry as the term of choice (Reeves & Jonassen, 2016) [9]. Web-based learning holds the promise of substantially transforming the way learning takes place because of its numerous advantages. Among these, Web-based learning fosters greater accessibility to learning by offering anytime and anywhere delivery. With the widespread adoption of web-based learning techniques, measuring its effectiveness has become more of a priority. Different facets of evaluation include measuring learners' satisfaction with the experience, measuring their skill gains through pre- and post-tests (sometimes in comparison to learners who received traditional classroom approaches), gauging how learners applied their new knowledge in work settings, and estimating how the institution itself benefited from employee learning. In return-on-investment calculations, the latter entails an assessment of whether the benefits are commensurate with the cost of providing the training. Therefore, higher educational institutions are witnessing a paradigm shift brought about by the use of web-based learning techniques that others have even started seeing ICT as an indispensable tool in the teaching and learning process. As a results the research findings revealed that students, are continually exposed to the capabilities of web-based learning, and their perceptions towards change. The lecturers' involvement in the assessment of web-based learning techniques have also changed positively in teaching and learning. It is evident from the findings in the study that some schools are now putting more effort to integrate web-based learning techniques in teaching and learning. With this, lecturers are faced with the responsibility to utilize and operationalize Web-based learning techniques in their teaching process.

Recommendations

From the findings of the study, it is recommended as follows:

1. Students should be provided with adequate training on how to use the various web-based learning tools in learning processes, as to apply the requisite knowledge and skills in achieving quality instructional outcome in higher education.
2. Students should be provided with adequate online forums to improve their learning.
3. Students should be equipped with ICT specifically, web-based learning skills such as mobile technology, software applications etc to improve their learning ability.
4. Certain individual learning preferences should be complemented, even if certain times satellite broadcast can cause distraction.

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