Research Article

Transforming History Pedagogy: The Role of Innovative Technologies in Undergraduate Education in Odisha

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Abstract

This paper provides a theoretical foundation for bringing an overhaul in undergraduate history teaching-learning in Odisha by using the emerging technologies. It asserts that traditional history andragogy is marked by memorisation and passive learning. The students need to be ready with 21st century skills to be able to compete in the job market or to continue their higher studies. The learning theories of experiential learning and connectivism are the basis of technology infused learning. Knowledge is gained from personal learning networks and collaboration and not by rote learning. The article has elucidated on the pedagogical uses of digital humanities tools namely, Google Scholar, Jstor, Omeka, data visualisation software, Digital Library of India, NAMAMI, Sahapedia and Digital South Asia Library. Thus, learners will become prosumers of online content and can learn to apply their learning in real life.

Keywords: Connectivism, digital humanities tools, history, Andragogy, tertiary education

Introduction

The illiterate of the future will not be the person who cannot read. It will be the person who does not know how to learn.

- Alvin Toffler

Conventional history teaching in India has been marked by a bookish teaching method which was often not connected with the real-world needs and applications. This traditional way of transacting history curriculum places inadequate focus on fostering perceptual and analytical skills (NEP 2020; NCFSE, 2023). It even ignores active participation of students in information acquisition and fact checking. The current system often leads to mugging up of facts without deeper engagement. This andragogical approach is strengthened by a test-driven evaluation system where internal evaluations or activity-based learning have less weightage. (Bakshi, 2025). Sadly, this promotes superficial learning and does not account for deep learning. This results in learners considering history as dull where one cannot understand the lessons well. A passive teaching-learning environment cannot cultivate much needed transferable skills which one requires to survive in a dynamic knowledge society. The andragogical challenges are compounded by regional constraints of Odisha. The standardised curriculum and books often tend to overlook the rich tribal cultures and values prevalent in the state. The disconnect caused by cultural and linguistic reasons between standardised curriculum and the real life of the indigenous people makes the lessons less engaging. There is a dire need to implement culturally sensitive andragogical practices in our tertiary

level of education. The present situation of history teaching at undergraduate level is affected by political narratives. This harms the civic engagement and critical thinking skills. This can impact the ability of students for informed citizenship. the rapid growth and advancement of new technologies now provide a viable pathway to handle these curricular limitations. The COVID-19 pandemic has highlighted the need for digital and AI integration in our education system. Thus, the transformation of history teaching is an imperative to prepare the college students for the unknown complexities of the 21st century. The digital technologies allow the professors to make the lessons interactive using multi-modal approaches and successfully cater to the needs of diverse students (Aying, Awang and Ahmad 2019; Qureshi et al., 2021). The emerging technologies are seen as fundamental catalysts for changing history andragogy. They give opportunities to personalise learning, improve teaching interactivity and to ensure accuracy of students' performance in real time. This technological revolution in higher education can provide flexibility and accessibility to both students and lecturers. Technologies like Virtual Reality (VR), Artificial Intelligence (AI), gamification, digital humanities tools, and Geographic Information Systems (GIS) have the capacity to make the concepts come alive (Shikshak Parv, 2020). Thus, we can move from passive listening to immersive and analytical engagement. The true potential of technology in history teaching and research extends beyond its normal uses.

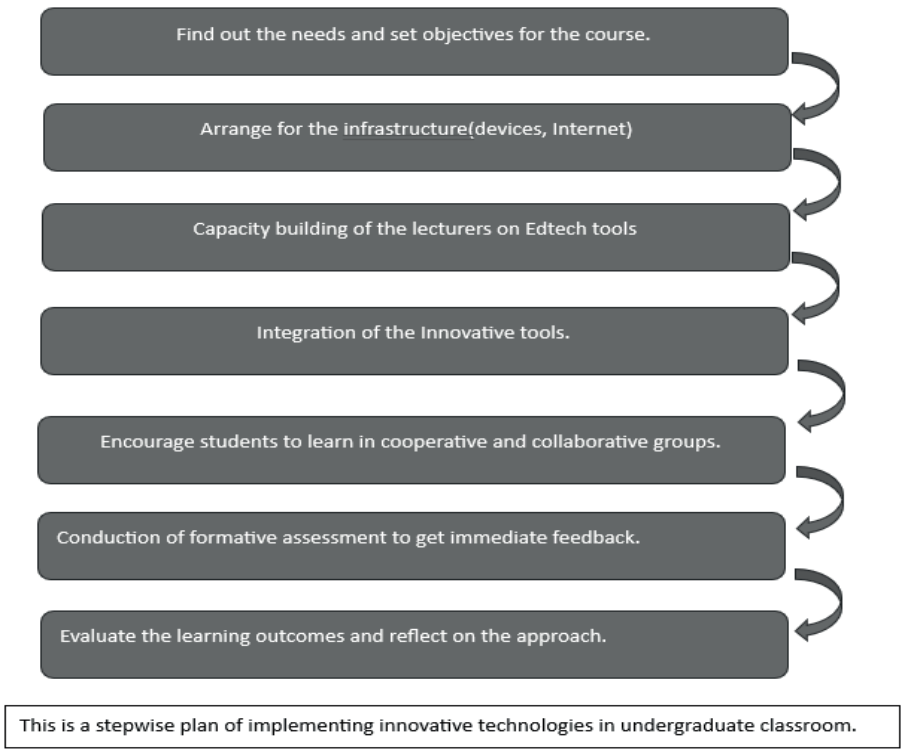

Fig. 1: Stepwise implementation of innovative technologies in undergraduate classroom

Figure 1 shows the step-by- step process of applying the disruptive technology in the classrooms by lecturers. The process is linear and has to be followed religiously for effective implementation of connectivism learning.

Innovative technologies must be implemented in the classroom in an orderly fashion. Firstly, we find out the needs and set the objectives for the course. Secondly, there has to be an arrangement of proper infrastructure. Thirdly, capacity building of the educators needs to be done using ed-tech tools. This is followed by the integration of innovative tools. After that, learners are encouraged to learn in cooperative and collaborative groups. To test the efficacy of digital pedagogy formative assessments are held to get immediate action. Finally, the learning outcomes are evaluated and lecturers will reflect on their approach before teaching the next lesson.

Literature Review

Recent scholarship has discussed the transformation of history teaching where a strong need for innovation in andragogy has been felt. Aying, Awang, and Ahmad (2019) have stressed upon the fact that digital technologies are effective in teaching history only when multimodal approaches are used which are also interactive in nature. Qureshi et al. (2021) has underscored the role of Education 4.0 technologies in improving the effectiveness of learners in an ICT integrated classroom as they transition from rote memorisation to active engagement. The National Education Policy (NEP, 2020) and the National Curriculum Framework for School Education (NCF-SE, 2023) give a policy background for inclusion of technology in the classroom with recommendations for research in digital pedagogies. Barbhuiya (2023) and Bakshi (2025) have looked at NEP 2020's recommendations and highlighted the scope of transformative practices in history teaching. The theory of connectivism that was introduced by Siemens and Downes, is reiterated by Gunawan et al. (2023) who argue that cutting-edge technologies develop collaborative learning networks in the time of industrial revolution 4.0. Gossard (2025) and Ennals (1982) have located history in relation to social media and artificial intelligence, depicting how knowledge networks mould pedagogy. Bates (2011) links AI and humanities, suggesting that digital pedagogy can transcend disciplinary boundaries. Hajdarović (2024) and Kalyani (2024) have focused on the democratic and participatory dimensions of digital technologies. Washburn and McCutchen (2024), along with Washburn (2025), have examined AI as an effective tool in transacting lessons of American Indian history. Thus, illustrating how indigenous history can be taught to foster historical empathy. Trust and Maloy (2023) have given strategies for teaching in an inclusive classroom using AI and collaborative tools. Sharma and Mishra (2024), Şahin (2025) and Shahid (2024) have argued that AI supported lessons can individualise or personalise learning. All the studies validate the use of digital humanities tools like Google Scholar, JSTOR, Omeka, NAMAMI, Sahapedia, and DSAL in fostering inquiry- based learning, critical thinking skills and developing a research-oriented mindset in learners.

Theoretical Underpinnings of Technology Based Andragogy

Connectivism as a way of teaching and learning was introduced by George Siemens and Stephen Downes in 2004. Connectivism is a recent learning theory which was designed for the digital age in the fourth industrial revolution stage for the information-based society where many of the students will work

as knowledge workers instead of the blue-collared jobs. This theory asserts that learning is spread out across the networks of connections. It also mentions that learning is a multifaceted and dynamic process of creating connections between specialised "nodes," that can include a multitude of entities for instance websites, organisations, databased, individuals or social media platforms. Connectivism allows a safe space for valuing a variety of opinions as it understands the hard truth that the ability to get more knowledge is crucial than what is currently known. It underscores continuous learning and the capacity to be able to identify linkages between disparate concepts, ideas, and fields. Connectivism aligns with blended as well as online learning environments. Here knowledge resides in huge interconnected networks. Digital platforms encourage the creation of Personal Learning Networks (PLNs), enabling students to connect with peers, experts, researchers, and diverse knowledge sources across the world (Gunawan et al 2023, Gossard 2025, Ennals 1982). Collaborative tools like Microsoft Teams, Google Docs and social media such as Facebook, WhatsApp, Instagram, X (Twitter), Snapchat, Skype encourage real time idea sharing, co-creation of knowledge and interaction (Kapoor and Bakshi, 2025). This approach empowers the learners to get acquainted with much-needed skills for navigating a technology driven world where digital literacy is needed. The college students get an opportunity to develop collaborative proficiency, critical evaluation of information adaptability to be able to thrive in today's workplace. Now as the knowledge is dynamic there is a shift in the marketplace where the ability to find out, evaluate and synthesise facts become crucial to survive instead of being able to memorise facts and becoming a walking encyclopaedia (Bates 2011; Barbhuiya, 2023). There needs to be a change in the educational landscape from a fixed curriculum towards a dynamic curriculum. Connectivism operates on the principle of life-long learning habits by participating in the world-wide knowledge networks. This is essential for thriving in the era of information deluge and the threat of misinformation and disinformation. The shift in the learning theories from behaviourism to cognitivism then to constructivism and finally to connectivism is a direct response to changing understandings of human capacity for cognition as well as metacognition. By connectivism we can maximise the effectiveness of the classroom situation in both blended classrooms and offline classrooms. Andragogy is the art of helping the matured students learn where focus is on self-propelled learning using real life issues. It is not textbook centric (Bates 2011).

Research Objectives

The paper aims to explore the disruptive technologies in the sector of digital humanities tools that have the potential of transforming the undergraduate history pedagogy in Odisha. These technologies can address the deep-seated limitations of conventional andragogical practices. Consequently, fostering 21st century skills and making way for collaborative and research-oriented learning in a culturally sensitive classroom.

Scope and Methodological Approach

This study is conceptual in nature as it adopts a desk review methodology. Its scope is confined to assessing the pedagogical transformation of undergraduate history education in Odisha through the perspective of digital humanities tools and innovative technologies. The paper synthesises existing literature, policy documents, and case studies to give an analytical

foundation. No empirical fieldwork has been done. The paper is set within the framework of experiential learning and connectivism.

Current Status of History Teaching

The progressive curriculum aims of history in Odisha at undergraduate and post graduate levels advocate for engaging andragogical methods. However, the reality is different. The faculty is comfortable in using conventional methods of teaching. Students are also more interested in studying for exams instead of looking for meaningful learning experiences. Classes usually are held in lecture mode complemented by weekly seminars. Some well-endowed institutions like Ravenshaw University, Utkal University and Ramadevi University have ICT based classrooms like smartboards, whiteboards, audio, and video tools for presentation. They often conduct field trips and show documentaries. Eminent scholars are also invited for seminars or conferences. However, these facilities may be absent in undergraduate colleges of Odisha. There is an overdependence on old-school methods on the part of faculty simply due to lack of faculty and lack of training in innovative teaching methods.

Objective of Innovative Technology In History TeachinG

The emerging technologies have given a wonderful pathway to rejuvenate history andragogy. It has tried to address the problems of undergraduate and post graduate students of Odisha. The inclusion of digital humanities tools has the potential of bringing transformation in history teaching and learning at tertiary level as already mentioned in this article. These tools encourage budding researchers to present their findings in a variety of ways and do their research using good quality sources at low cost. The UG and PG students can learn many ways of accessing primary and secondary sources as well as interpreting them. They will relate to the new knowledge that is being produced in their discipline across the globe.

Challenges of College Students In Understanding History

The study of history has often been assumed to be a memorisation of facts and dates. Students are still engaged in rote learning in many degree colleges of rural areas. There is limited scope for collaboration, creativity, critical thinking, and active learning. The classroom transaction should be moulded towards the development of 21st century skills along with teaching of historical concepts. In remote areas, there is often a lack of digital infrastructure due to which teachers cannot teach students using ICT or even guide them on how to use ICT properly. Moreover, fact checking and the skill of accessing digital archives for doing dissertation is not taught to students. This leads to lack of awareness of the students regarding how to access authentic sources at low cost. The lack of digital literacy of students can be a roadblock which needs to be overcome by peer learning or workshops. The contractual faculty at degree colleges have less knowledge of using innovative pedagogies. Moreover, lack of high-quality seminars and conferences can limit the mental horizon of students.

Role of Innovative Technology In History

Innovative technologies hold the key to making history teaching competitive and suited to the demands of the market. The Odisha State Open University (OSOU) gives e-resources for its history course. Ravenshaw University's Kanika Library gives e-resources namely Science Direct, ProQuest, EBSCO

databases. There is also a Ravenshaw Knowledge Centre that offers internet-cum-digital library and online reading room services. The Odisha State Tribal Museum has launched a virtual tour, allowing the global audience and even college students to access it. This project brings both tangible and intangible cultural heritage to students across the length and breadth of the state. Realising the immense potential of digital humanities tools GIET university hosted an "International Seminar on Digital Humanities and Redefining Research" to expound on the methods of using digital tools in transforming the research landscape of humanities. The emerging technologies have the capacity to reduce the problem of rote learning, make learning contextual and overcome the issue of student disengagement. As the class will be based on "learning by doing" the attendance will also improve.

Digital Humanities Tools

AI tools and Digital applications have turned into a must have component of connectivist classroom of undergraduate level. They enable both the faculty and the students to have collaborate with peer or colleagues, share their findings in creative ways and access to ginormous amount of information. Digital databases and archives give a huge repository of primary and secondary sources both of government and private citizens (Hajdarović 2024, Kalyani 2024, Washburn and McCutchen 2024, Washburn 2025). This helps the budding researchers to involve themselves in rigorous historical research. These tools allow the users to develop communication skills, research skills and critical thinking skills. the adult learners can hone their skills of judging the reliability and biasness of the sources, critically analyse complex historical narratives and make their own interpretations of the past and of the present as well as predict future trends. Moreover, digital humanities tools allow communication in various forms and cooperation by giving a platform to work on shared projects and share their findings with the world. Digital Library of India (DLI), National Mission for Manuscripts (NAMAM), Sahapedia, Digital South Asia Library (DSAL), Library of Congress, Google Scholar, JSTOR are used in India intensively as digital humanities tools which provide free access to research articles and historically relevant documents. Omeka, Voyant Tools, ArcGIS/QGIS, TimelineJS/StoryMapJS, TEI (Text Encoding Initiative) are used internationally in the field of humanities. Special tools text analysis software, data visualisation tools (Power BI, Tableau) and timelines give a wonderful way to interpret historical data. Open-source publishing tools like Scalar and Omeka give historians a chance to publish their academic work and create multimedia infused presentations.

In Odisha, such tools have been used a lot. The DHARMA project is an initiative that stresses on the digital documentation of ancient copper plate inscriptions kept at Odisha State Museum and Utkal University. This project aims to improve the accessibility and visibility of these precious historical records relating to the Samadanis, Bhaumakara and Eastern Ganga dynasties. Another project was carried out by Ravenshaw University called EAP1616 to digitise the periodicals, magazines and newspapers from Utkal Sahitya Samaj. These publications are instrumental in showing the history of colonial period of Odisha. These tools allow students of Odisha to access these precious primary records easily from anywhere in their laptops.

1. **Digital Library of India (DLI)**

   The Digital Library of India is a mammoth project of Indian government which is involved in

preserving and digitising the literary, historical, and scientific works. It is a huge, public -access repository where one can easy access to a variety of documents and books. Many of the rare and out of print books are also stored here. This platform has successfully turned into an online archive of Bharat's tangible as well as intangible intellectual heritage where materials are freely available for research and study purposes. One can get multilingual content which can be browsed easily using keywords. History scholars can use Digital Library of India to study the rare books, pamphlets, and government reports. The college students can use this site for multidisciplinary research. For instance, a student who wants to find out the economic history of his district can search the library to get administrative reports and books of eminent authors which can support his arguments.

2. Sahapedia

Sahapedia is an online resource which works as an online encyclopaedia of Indian art, culture, and heritage. The website stores and curates its content in a multimedia type file. It also stores videos, articles, maps, and expert interview recordings for reference purpose. Sahapedia's aim is to take part in creating a digital knowledge infrastructure that is reliable, trustworthy, academic, and accessible to the public at large. It wants to reduce the gap between academic knowledge and layman's understanding. All the content are stored thematically for easy retrieval. Non-specialist audience and undergraduate students can use this platform seamlessly. Postgraduate students can easily understand the cultural history of their home district for bringing out high quality dissertation. Sahapedia does not store primary materials and can only provide secondary materials. There is no chat room for scholarly discussion and debates. Semapedia's content on Ratha Yatra festival of Puri, Patta Chitra, Odissi dance, Chau dance and folk dances can be used to research on the cultural aspects of Odia culture and how it has redefined Indian culture at national level.

3. National Mission for Manuscripts (NAMAMI)

NAMAMI is a flagship undertaking of the Indian government which intends to digitise and preserve India 's manuscripts of every language. It is crucial for making fragile manuscripts available to a larger body of student researchers from various centuries. These are valuable primary sources which will give a better foundation to our research culture. Moreover, these manuscripts can be shown in classroom using ICT to make the learning experiential and realistic. This mission is the hub of Indology, Ancient historical studies, and Medieval studies. This platform allows online visitors to read the high-resolution images of the manuscripts for detailed study. The required manuscripts can be searched for using its easy-to-use database. Some manuscripts have been transcript. This platform is heaven for philologists and historians who can produce authentic research easily by sitting in their home or in their offices. The digitally stored texts are safe from further degradation due to natural or artificial causes. Researchers at Indira Gandhi National Centre for the Arts have used the NAMAMI platform to conduct a deep study into the evolution of Odia script or Dinalipi by looking at the manuscripts from

several centuries. They have traced changes in grammar, intonation, syntax, morphology, graphology, and vocabulary. The manuscript of Sarala Das's Odia Mahabharata is also stored here. NAMAMI can provide the undergraduate as well as post-graduate students a hands-on experience of manuscript-ology as a discipline.

4. Digital South Asia Library (DSAL)

Digital South Asia Library is a gigantic effort of the libraries and universities across the world to give high quality resources to college students for studying the social scientific aspects of South Asia. This library is a crucial tool for humanities field as it has the collection of digitised modern era materials right from colonial period to the post-modern times. One can find the census reports, old gazetteers of historical importance and dictionaries of Indian languages. Here historical data has been made machine friendly and easy to search and work with. DSAL can be used by full-text searching. The collection of DSAL does not contain materials from ancient and medieval history. It is useful only for people who are dealing with modern history. The undergraduate students and post-graduate students need some training before they use the DSAL. Historians from North America, Europe, Asia, and Africa often use Digital South Asia Library to get authentic materials for research on India. the college students can go through the contents of this platform to understand the and interpret the impact of colonial policy on Odisha.

5. Google Scholar

Google Scholar is a free to use search engine where one can academic articles published anywhere in the world. It has become an invaluable tool for researchers across all disciplines. One can find thesis, journal, research articles, conference proceedings, monographs, books, and abstracts. This platform does not create any new content but it allows all research work to be within our reach within a click of the mouse. It even shows the citations, related articles scholar profile and publication details. One can set up the alert system of Google Scholar to get updates on the new research on any specific topic. This platform has become the first place where all researchers go to look for academic literature. The site also provides a citation tacking feature which is useful in understanding the global impact of any research paper. Google scholar has indexed top-tier journal and non-peer reviewed journal. A professor can ask his students to research the military history of ancient Kalinga by going through the related academic articles. The students would gain a quick overview of the topic and can see how the interpretations have changed over time.

6. JSTOR

JSTOR is a renowned online library that provides access to a vast academic literature which can be both secondary and primary sources. JSTOR's contents are vetted and curated allowing for a high degree of scholarly rigour. It has few tools to help in topic modelling and finding thematic trends. the content from peer-reviewed journal is also present here. This platform has a permanent archive of academic publications. this platform is subscription based which means to access this one need institutional subscriptions. This is a barrier for rural college students. Its coverage is limited to humanities disciplines.

7. **Omeka**

Omeka is a free to use web publishing website where one can create online exhibitions or digital collections. It has a user-friendly interface which implies that even students with no previous knowledge of computer coding can build high quality digital archives. Students can upload qualitative data where each item is telling a story which can be understood by using all our senses and emotions. There are tools to group data and generate narratives for better understanding. This is useful for ethnographical research. For instance, a person doing research on the tribes of Kandhamal can showcase the culture of the tribe in an online exhibition. The researcher can showcase his collections of a few thousand items easily. This supplements his written work and gives life to his research. This is a godsend for people conducting research on low budgets. However, users need to be adept in setting up their own online exhibition. One can use Omeka to create online exhibition for their hometowns where Odia culture can show to the global audiences.

8. **Data Visualisation Tools (Power Bi and Tableau)**

Tableau(Salesforce) and Power BI are impressive business intelligence tools which are popular in digital humanities for data visualisation. They are able to use the raw data and generate graphs, charts, maps, and dashboards with a drag-and -drop interface. These tools are good at converting the complex quantitative data into attractive visual narratives. It can connect to data from web databased and excel spreadsheets. One can use this tool for geospatial mapping to teach geographical history or population geography. These software tools need no coding of data. These tools are able to manage large and complicated datasets. These tools are highly sought after in the job market. Mastering these tools will help the students to be at par with the market needs. Historical concepts can be shown through visual stories that are interesting and easy to comprehend. Power BI has a free version which students can use making it accessible to a wider band of students. Before using this tool, students need a bit of handholding. Historians and economists have used Tableau to present the census data of 20th century in visual form where slow changes in the population can be tracked. The students can use literacy rates of the district from 1900-2011 and draw inferences about the socio-economic changes of the population.

Limitations and Future Research

This paper has no empirical backing (absence of surveys, classroom observation, or interviews). Its findings are theoretical and interpretive in nature instead of being statistically validated. The analysis depends upon secondary data only taken from policy documents, project reports and published literature. Its findings may not be generalised to other states of India or to other nations without adapting it for local realities because it was primarily based for Odisha's context. Moreover, no attempt has been made to measure the gaps in digital literacy gaps among the learners and faculty. Future research can be done using cross regional studies to get a comparative analysis on the differences in the integration of technology in history teaching. Longitudinal studies can be conducted to see the impact of

technology on research skills, historical empathy and employability.

Conclusion

The improvement of history andragogy in undergraduate stage in Odisha is likely to be driven by the emerging technology soon. There will be a sea-change in the teaching-learning process. Odisha is suffering from digital divide and the lack of know-how of the proper use of the digital tools. The curriculum at college level ends becoming irrelevant due to this issue. The new technology allows a scope for making the syllabus more useful by making it more practical in nature. The theoretical foundations of this change are rooted in connectivism and experiential learning. These theories have asked for a transition from passive, teacher centred learning towards active learner centred learning. Here ideas are understood and knowledge created by networked collaboration and direct experience. The new disruptions like Augmented Reality (AR), Virtual Reality (VR), Mixed reality (MR) give entrancing experiences that can develop historical empathy and emotional connection with events (Sharma and Mishra 2024). Thus, the discipline moves closer towards a lived history instead of dealing with abstract history. Artificial Intelligence allows both learners and history enthusiasts personalised learning paths. It also gives smart tutoring (Sahin 2025, Sahid 2024). Digital humanities tools have the capacity to democratise access to primary as well as secondary sources. This will give opportunities for conducting authentic research. NEP 2020 has encouraged the use of technology to attain learning outcomes at all levels of learning. The lecturers and the guest faculty need comprehensive and regular tech-based training and capacity building programme to keep pace with the dynamic world of educational technology. Technology gives scope for countering plagiarism, historical biases and giving equal opportunities to all sections of the society to safely share their side of the story on any historical event or issue. The policymakers must ensure that digital neocolonialism is kept under check while using technology in classrooms.

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