Review Article

Peeragogy: A Nascent Approach of Digital Age

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Abstract

The advancement of technology has motivated and empowered learners all over the world to connect and collaborate with other learners to co-construct knowledge and co-learn. These connections among peers have made it possible for the learners to self-direct their learning process by creating, delivering learning and teaching together an agreed curriculum. Peeragogy is one such approach for learning and knowledge production with the help of peers through reflection, critical thinking and thoughtful discussions. It is a collaborative strategy that has its foundation in the behaviourism, cognitivism, constructivism and connectivism theories of learning. Peeragogical interactions among a group of people or community with similar interests called "paragogues" lead to online exchange of ideas in order to influence one another's perceptions and also help in building digital skills and social skills. This paper focuses on the newest educational approach, i.e., Peeragogy, which accentuates self-regulated student-centred learning and focuses on collaborative learning through online networks. It also highlights the difference between pedagogy, andragogy, heutagogy and peeragogy. Designing peeragogy's learning activities based on the tenets of peeragogy and the role of a peeragogue is also discussed in this paper to exhibit how this potential approach of learning can assist students in gaining the knowledge and skills necessary to thrive in the twenty-first century by employing digital media to connect, co-construct, and co-learn.

Keywords: Paragogy, peeragogy, pedagogy, andragogy, heutagogy, connectivism, peer- learning,

Introduction

"If we teach today as we taught yesterday, we rob our children of tomorrow."

-John Dewey

With a paradigm shift in the process of education, the approaches of education have also evolved over time to meet the requirements of society – from pedagogy to other approaches of education, that are andragogy, heutagogy and peeragogy. The practice of sharing knowledge and learning informally from each other has been witnessed for ages. The roots of peer-based learning lie in peer interaction. Formally, it actively engages learners in discussions and group work and mutually benefits them through collaboration. It aims to develop a sense of collective responsibility and self-management among peers. It can be defined as "the acquisition of knowledge and skill through active helping and supporting among status equals or matched companions. It involves people from similar social groupings who are not professional teachers helping each other to learn and learning themselves by so doing" (Topping, 2005). It engages pupils with one another in order to attain educational objectives, thus, making them move from an independent learner to an interdependent and collaborative learner. The process of

peer learning assigns responsibilities to both the faculty and the students towards the successful completion of tasks and the development of various skills such as communication skills, self-management and organisational skills, interpersonal skills, collaborative skills and problem-solving skills. It also fosters the ability to enquire, think and reflect critically. The fundamentals of a person's cognitive growth are social contacts, and the sharing of ideas and experiences, and student interactions lower the task's complexity. Peer learning is seen to be a good strategy to improve learning outcomes.

Education has witnessed numerous revolutions through research for the last three decades to study how learning and teaching must be carried out (Kenyon & Hase, 2001). Education 4.0 is a recent paradigm that elucidates the notions of learning in light of Industry 4.0, which focuses on web-driven e-learning and knowledge construction through connections. It encourages learning in a new way, mostly via the use of technology-based tools and resources. Technology has a substantial influence on educational growth. The learners are encouraged to collaborate digitally and co-create knowledge. Connectivism, a learning theory propounded by George Siemens and Stephen Downes in 2005, contributes uniquely to the digital era, helping learners with diverse opinions to collaborate through a variety of networks beyond formal educational settings to find solutions to their questions. It proposes that the knowledge accessed by virtue of one's connections with other individuals or peers is as worthy as the information possessed by the individual minds. According to Siemens and Tittenberger (2009), Connectivism refers to "knowledge and cognition are distributed across networks of people and technology, and learning is the process of connecting, growing, and navigating those networks." The social networks so formed provide ways to move from individual sets of knowledge towards a more relevant and futuristic way of learning.

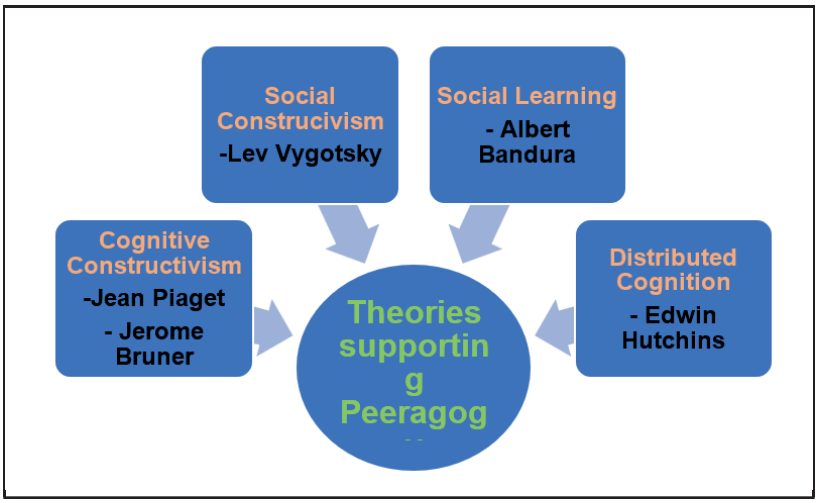
Peeragogy is a nascent approach which allows recognition of the value of these connections and uses digital media to connect, co-construct and co-learn in the digital era, which helps in building 21st-century skills and competencies. Charles Jeffrey Danoff (2012) assumes the *Context of learning, Timing and sequence, Social reinforcement and experiential awareness are* the key factors of adapting peeragogy and thus expanding knowledge and skills of each peeragogue. P2PU was one of the first online peer learning communities, and its courses have sparked the creation of a slew of new online alternatives to traditional institutions in recent years.

Theoretical Framework: Learning Theories Supporting Peeragogy

The proponents of Cognitive Constructivism – Piaget (1972) and Bruner (1990) and Social Constructivism -Vygotsky (1978) laid the foundation for peer teaching and learning. Piaget's theory of Cognitive Development (1985) emphasises the active interaction and involvement of peers in the process of knowledge construction. Peer interactions also encourage cognitive improvement and enhance learning outcomes as compared to individual efforts. Bandura's (1977) Social Learning theory advocates that observational learning significantly impacts human behaviour by transforming the information into cognitive representations. The relevance of the social environment in learning new behaviours was underlined by Bandura in particular. He proposed that people learn to respond to others' behaviours by observing their own conduct. The Sociocultural theory of Learning developed by Vygotsky (1978) emphasises the involvement of more

knowledgeable others (MKO) - teachers, adults or peers to aid the learner in the construction of knowledge. According to Vygotsky, "Every function in the child's cultural development appears twice: first, on the social level and, later on, on the individual level; first, between people (inter-psychological) and then inside the child (intra-psychological). This applies equally to voluntary attention, logical memory, and the formation of concepts. All the higher functions originate as actual relationships between individuals". According to Vygotsky, learning takes place in the Zone of Proximal Development. With the help of adults or children who are more knowledgeable, students can understand concepts and ideas that they cannot grasp on their own. During the 1990s, Edwin Hutchins propounded the theory of Distributed Cognition, which states that knowledge exists not just within the person but also in the individual's social and physical surroundings. It believes that cognition processes are the result of social interactions among the members of a social group and their environment.

Figure-1: Theories supporting Peeragogy



Literature Review

The evolving theory of paragogy is deeply rooted inside peer-learning and came into existence due the challenges faced while undertaking peer learning. The term 'Paragogy' was coined by Joe Corneli and Charles Danoff in 2011. Literally, '*Para*' means *alongside and* '*Gogy*' means *leading*. The term 'Peeragogy' coined by Howard Rheingold in 2012 and advocated integration of social media and paragogy. 'The Peeragogy Handbook' illustrates how ongoing Wikimedia projects and the design of a future university manifest peeragogy which is embedded in the values and ways and means of peer production. It is a peer-based learning approach where students teach and learn from one another utilizing digital tools to develop connections and a common knowledge base. It allows students to learn together by encouraging and supporting one another as they acquire cognizance, adeptness and capabilities through the use of ICT required in 21st century (Alexander et al., 2012; Antipuesto & Tan, 2020; Chan et al., 2019; Corneli et al., 2015). The behaviourism, cognitivism, constructivism, and connectivism theories of learning provide the

foundation for the peeragogy, a collaborative approach that accentuates student-centered learning and enables self-regulated learning (Zhang & Bayley, 2019).

A systematic literature review technique was used by Bizami et al. (2022) to investigate the mapping of the principles of three Education 4.0 innovative pedagogies, namely heutagogy, peeragogy, and cybergogy, with the capabilities of three technological learning tools, namely Facebook (FB), Learning Management System (LMS), and Blog. The findings reveal that the cognitive element is the most closely associated pedagogical principle to the four key capacities of technological learning tools, namely time, self-related, learning task, and learning community-related. This mapping is important for instructors to plan learning and teaching by selecting technological learning tools that align with relevant Education 4.0 pedagogies for optimising immersive blended learning practices. Amirrudin et al. (2023), in their study found that the heutagogic, peeragogic, and cybergogic approaches in the classroom are significantly impacted by the andragogic approach. The study also reveals that the pupils' ability to study independently is also strongly impacted by the use of peeragogic, heutagogic, and cybergogic approaches. By allowing for student autonomy in the classroom, peeragogy, heutagogy, and cybergogy techniques also enable students to create their own self-regulated learning. This method of practice has a sizable impact on enhancing pupil self-regulated learning.

NEP 2020 (para 4.5) focuses on fostering critical thinking skills, discussion-based and collaborative learning environments that resonate strongly with peeragogy's emphasis on collaborative peer-based learning. Peeragogy learning can help students become more critical thinkers by introducing them to technology, helping them collaborate in groups to solve problems set by the teacher, and encouraging them to voice their opinions more actively (Prasetya, Nuraeni & Shabir, 2022). Li and Salleh (2023) identified that the student needs to be capable, self-aware, proactive in communicating their opinions, well-organized, and eager to assist during online Peeragogy. Baskoro et al. (2023) developed a model that integrates the peeragogy learning strategy, the 7E learning cycle, and the newest AI tools as a tool and found that the cognitive domain in the peeragogy learning system can function more effectively with the application of AI.

Peeragogy is relatively nascent approach to learning and knowledge production. However, it shows potential to address contemporary learning requirements, there is a dearth of research in this area.

Research Methodology

In this study, the investigators used qualitative research design and employed content analysis as the research technique to deduce the valid inferences by interpretation and coding of the textual material as available in the related research works.

How is Peeragogy different from Pedagogy, Andragogy, Heutagogy?

Azevedo et al. (2012), Matsuyama et al. (2019), and Wangid (2014) corroborated that student-centered learning has good effects on learning outcomes and the manner in which learning is imparted to increase students' skills. Changes from teacher-centered learning to student-centered learning are encouraged by using andragogic, peeragogic, heutagogic, and cybergogic approaches (Chan et al., 2019; Hase, 2016; Muresan, 2014). The progression in approaches of education from pedagogy to andradogy, heutagogy and peeragogy depicts paradigm shift from Education 1.0 to 4.0. These approaches differ from each

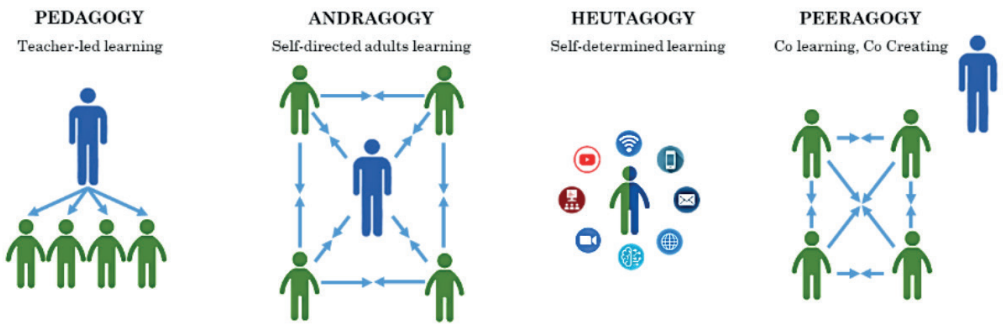
other in various aspects- nature, scope, principles, techniques and methods, the role of the teacher and the learner.

'Pedagogy' deals with the knowledge transmission from teachers to students. According to Merriam-Webster Dictionary Online (2014), it is "the art, science or profession of teaching". It is derived from two Greek words - 'paidos'(child) and 'agogus'(leader) which means leader of a child (Holmes & Abington-Cooper, 2000).

The term 'Andragogy' was pioneered by a German teacher Alexander Kapp in 1833 to portray the teaching style of Plato who solemnized Socratic principles. According to Merriam Webster Dictionary Online (2014) it is defined as "the art and science of teaching adults." Malcolm Knowles defined Andragogy as, "the art and science of helping adults learn."

The heutagogical method may be understood as a progression from pedagogy through andragogy to heutagogy, with learners maturing and becoming self-sufficient (Canning, 2010). It is rooted inside andragogy and focuses on metacognition. Stewart Hase and Chris Kenyon first coined the term 'Heutagogy' in 2000 and described it as "the study of self-determined learning which is independent of formal teaching." According to Hase, S., & Kenyon, C. (2000) heutagogy is "the study of self-determined learning, may be viewed as a natural progression from earlier educational methodologies—in particular from capability development- and may well provide the optimal approach to learning in the twenty-first century." It is a learner-centred approach which perceives the learner as a driving force in their own learning. It believes that learning occurs as an outcome of personal experiences (Hase & Kenyon, 2007). Canning (2010) explains that the advancement from pedagogy to andragogy, then to heutagogy requires more learner's maturity and less instructor's control and course structuring.

Figure-2: Approaches of Education – Pedagogy, Andragogy, Heutagogy and Peeragogy



Source:https://jurnalindustri.petra.ac.id/index.php/ind/article/view/27103/21004

Peeragogy is different from pedagogy, andragogy and heutagogy on the basis of the learning process.

Table-1: Learning process of different Educational Approaches

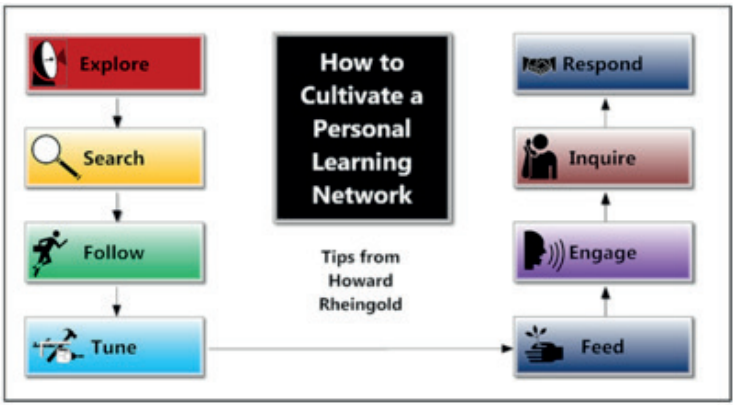
Educational Approach	PEDAGOGY	ANDRAGOGY	HEUTAGOGY	PEERAGOGY
Learning Process	**Unidirectional Instructor- led**	**Bi-directional Self- directed**	**Multi-directional Self- Determined**	**Decentralised-Peer to peer**

The theory of peeragogy (also referred as paragogy), is a contemporary theory of peer-to-peer (P2P) teaching and learning that "addresses the challenge of peer-producing a useful and supportive context for self-directed learning" (Corneli and Danoff, 2011). Peeragogy is about peer learning and peer production together as well as making each other in the group learn in their own way. Each peeragogue's contribution depends on their metacognition, i.e., the self-awareness of one's own thinking process. It deals with what people use for producing and applying knowledge together through online networks. It asserts that peer learning observes collaborative power sharing, co-creating and co-learning with co-responsibility. Longfellow, May, Burke, and Marks-Maran (2008) profess the importance of peer learning as "whilst teachers may be experts in their subject area, students are experts at being students, and thus are arguably better placed to lead novice students towards becoming expert students". This peeragogical approach revolutionises the reigning educational paradigm by injecting peer learning through collaborative efforts of teachers and students, and also among students. Peeragogical interactions require the refinement of various skills such as critical thinking, reflective thinking, collaboration, decision-making, mindfulness, patience, compassion, social skills, digital skills and negotiation skills. Alexander et al. (2012) elucidated that peeragogy is "peers learning together and helping each other learn." Every member of the group contributes and participates in his/her own unique way. It enriches the process of learning through horizontal associations between people who have diverse goals that can be carried out separately through communication.

Personal Learning Network and Peer Learning Network

The Peeragogy Handbook by Howard Rheingold defines Personal Learning Networks as "the collections of people and information resources (and relationships with them) that people cultivate in order to form their own public or private learning networks — living, growing, responsive sources of information, support, and inspiration that support self-learners" and Peer Learning Network as " A network of people who share their profiles and experiences, and collaboratively work, learn, teach, and communicate." Developing and sharing peeragogical profiles plays a significant role in the course of peer – based online teaching and learning.

Figure-3: Tips to cultivate Personal Learning Network

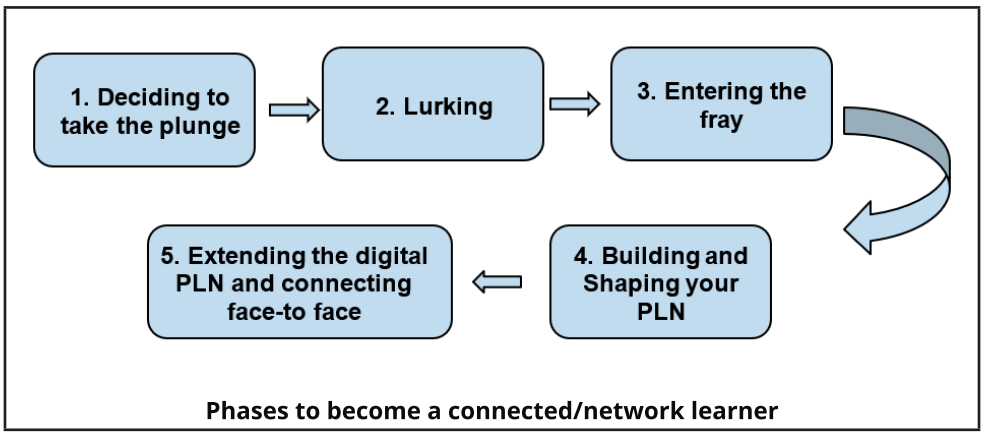


Source: https://en.wikibooks.org/wiki/Peeragogy_Handbook_V1.0/Print_version

Becoming a Peeragogue – Connected/ Networked Learner

With the advent of ICT, a research expert Stephen Downes witnesses, "the expectations of teachers have grown from being expert in the discipline of teaching and pedagogy...[to needing to have] up-to-date and relevant knowledge and experience in it. Even a teacher of basic disciplines such as science, history or mathematics must remain grounded, as no discipline has remained stable for very long, and all disciplines require a deeper insight in order to be taught effectively." Peeragogy is extremely beneficial for educators as they are expected to be primed and must have relevant knowledge, skills and expertise in the field. The Peeragogy Handbook, 3rd Edition, identifies the following phases to become a connected/network learner.

Figure-4: Phases to become a connected/network learner



In the first phase, investing time necessary in meta-learning and sharing in an open, connected world is important for the learner. In the second phase, the lurker needs to make a digital presence via blogs or wikis and twitter and following other users and observing their educational conversations and seek other information in blogs, Facebook, Edmodo, and LinkedIn groups. Once a lurker decides to engage in a discourse with another user, he or she begins to evolve into a networked educator-learner in the third phase. A personal blog post, involvement in an educational blog or wiki, or a Twitter conversation is useful for this purpose. Relationships may emerge as a result of this interchange, and work on establishing a Personal Learning Network begins. In the fourth phase, the active sharing and open learning are demonstrated by the learner to attract peeragogues with similar interests to shape their Personal Learning Network (PLN). Face-to-face interactions with other networked learners can aid to develop network relationships and increase their long-term viability. Thus, in the fifth phase the peeragogue or the networked educator-learner may decide to move their learning into physical settings and connect with each other through 'unconferences'.

Tenets of Peeragogy

Corneli et al. stated five paragogical principles which are as follows:

i. Decentralised center- Interaction by decentralising the center i.e., changing the space: In a collaborative learning setting,

students are expected to participate as individuals, the learner develops an understanding of their own self-concept.

ii. Meta-learning as a source of knowledge- Interaction by changing one's own style of learning: Within their learning community, each learner chooses and designs their own curriculum.

iii. Peers provide feedback- Interaction involves different but equal perspectives: Regular feedback is provided by the peeragogues (or paragogues) to the learners for reflection.

iv. Learning is distributed and non-linear- Interaction by changing the ways of connecting with members of the group: The learner uses an open online platform to co-create knowledge with other members of the learning community.

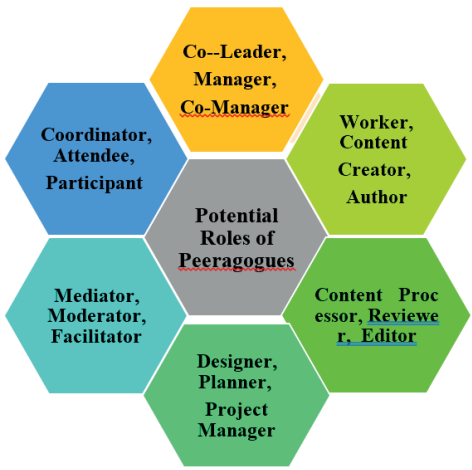
v. Realise the dream then wake up! - Interaction by changing one's own perspectives: If the learner has achieved the objectives, he can move on and join new knowledge community and if he is unable to finish it, he should act to complete the learning and achieve objectives.

Above mentioned working principles, make peeragogues entitled certain rights. They are: Right to speak, Right to be heard, Right to listen, Right to cooperate in proliferation of other options and Right to co-lead.

Group work and Potential Roles of Peeragogues in Peeragogy

Peers involved in peeragogical learning contribute in group. A group consensus must be established for learning objectives, media, technology and social contract of the course. A process for communication with one another must be formulated w.r.t responding, timely feedback and performance evaluation at course completion. Changes to the learning environment must be implemented.

Figure 5: Potential Role of Peeragogues



Potential Motivations of Peeragogy

The Peeragogy Handbook V1.0 alludes the following potential motivations for peeragogues.

1. Attaining required training or support related to the topic or field;
2. Fostering relationships with other people interested in the field;

3. Locating professional prospects and opportunities through other members;
4. Establishing or strengthening a personal network;
5. Developing organizational and rational thinking skills through discourse and debate;
6. Receiving feedback regarding his/her own performance and comprehending of the topic.

Wiki: A good tool for peeragogy projects

A wiki is a good tool for collaboration, co-facilitation, self-election, communication, documenting changes by keeping some rules without constraining creativity. It is especially suitable for ongoing work as changes can be tracked easily by comparing or rolling back the previous versions. According to Wikipedia "a wiki is a website whose users can add, modify, or delete its content via a web browser using a simplified markup language or a rich-text editor." It also helps in reducing the complications in coordination, making links between wiki pages, dealing with the work in progress and capturing an on-going work. It also supports transparency as one can easily see what other members of the community are doing. '*Appropedia*', *'Teahouse' and 'News on wiki*' are exemplars of peeragogy projects running on wikis.

Illustration: Designing Peeragogy's Learning Activity through e-learning

Course's Name: Educational Technology Foundation & Research

Topic: Research Trends in Educational Technology

Table-2: Design of Peeragogy's Learning Activity

Instructions	Learning Tools	Peeragogy's Principles	21st Century Learning Skills
1. You have to create an online community of 2 of your course mates and others experts that you think suitable. Assign a Task to take every member; such as facilitators, learners, contributors, experts etc.	Facebook's Group	Co-learning	Critical Thinking Collaboration
2. In the Facebook's group, discuss the issues related to our class topics. Prepare required teaching notes/learning materials that are needed Make sure the learning materials have been verified by your class instructors	Internet Powerpoint Prezi Blog Facebook's group	Co- Creation of Knowledge	Critical Thinking Life- Long Learning

Instructions	Learning Tools	Peeragogy's Principles	21st Century Learning Skills
3. Prepare 2-3 essay questions that you would like the members of the community to answer related to issues that have been discussed before.	Facebook's group	Self-determined questions that will be answered	Reflective Thinking
4. Share the answers with experts and mark the answers and give appropriate scores based on 10%.	Facebook's group	Self- Assessment	Critical Thinking
5. Wrap up session...			

Source: https://www.youtube.com/watch?v=ZV80vsgq1ec&t=7646s

Conclusion

Peeragogy has its foundation in the behaviourism, cognitivism, constructivism and connectivism theories of learning. It offers a critical focus on peer learning through social connections using technology to connect, co-construct, and co-learn in the digital era and assist in the development of 21st century skills and competencies. It provides an outline for techniques and practices aimed at peer learning and peer knowledge production characterised by flexibility and scalability. Teachers, students or any interested community can become peeragogues. Educators benefit greatly from peeragogy since they are expected to be up-to-date and have appropriate information, skills, and competence in the subject. It offers numerous advantages, including assisting students in gaining their own grasp of a subject, boosting self-esteem, honing critical thinking abilities, fostering interpersonal relationships, and taking charge of their own education. Peers learn and teach together using technology outside or inside the formal institution by co-working towards facilitating, researching, observing, creating, developing, originating, curating, mapping, aggregating, refining, designing, writing, converting, editing and formatting. Metacognition, or self-awareness of one's own cognitive process, determines each peeragogue's contribution. It is concerned with how people produce and apply knowledge via internet networks.

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