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"INTELLECTUAL PROPERTY RIGHTS IN THE DIGITAL ERA: AWARENESS AMONG FACULTIES AND STUDENTS AND THE ROLE OF EMERGING TECHNOLOGIES"

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ABSTRACT :
Intellectual Property Rights (IPR) are essential for promoting innovation and safeguarding intellectual assets in the digital age. The rapid development of emerging technologies such as artificial intelligence (AI), block chain, and biotechnology has transformed the IPR landscape, introducing both challenges and opportunities. AI-generated content raises questions about authorship and ownership, while blockchain improves transparency in copyright and patent management..
This study investigates the awareness levels of faculty and students regarding Intellectual Property Rights (IPR) and examines the impact of emerging technologies on intellectual property frameworks. A mixed-methods approach, incorporating structured surveys and qualitative legal analysis, is used to evaluate knowledge levels, perceptions, and challenges related to IPR enforcement in the digital era. The findings reveal significant gaps in awareness, particularly among students, highlighting the need for improved educational initiatives and legal reforms. The study recommends integrating IPR education into university curricula, utilizing technology for IP management, and updating legal frameworks to address evolving challenges. Enhancing awareness and policy measures will help build a well-informed academic community, promote responsible innovation, and ensure effective protection of intellectual assets in the dynamic digital landscape..
Keywords: Intellectual Property Rights, Digital Era, Emerging Technologies, AI, Block chain, Awareness

INTRODUCTION:

The emergence of digital technologies has revolutionized the creation, administration, and safeguardingofintellectualproperty.Traditionallegalframeworksneedtobereevaluatedinlight of the opportunities and problems the digital age has brought to the enforcement of intellectual property rights (IPR). IPR regulations must change to take into account new types of creative output, ownership disputes, and safeguard mechanisms as industries embrace technology-driven solutions more and more [1].
Automation, decision-making, and content creation have all been transformed by artificial intelligence(AI).Existingcopyrightlawsareputtothetestby AI-generatedliterature,music,and artwork, which raise questions about authorship attribution, legalre cognition, and protection[2]. Similartothis, property since it provides unchangeable records for patents, trademarks, and copyrights [3]. Block chain's decentralized structure improves security and verifiability, which lowers ownership and infringement issues [4].
Biotechnology has further complicated IPR by expanding the boundaries of patentability. The patenting of genetic sequences, gene-editing technologies, and pharmaceutical formulations has sparked legal and ethical debates regarding ownership, accessibility, and commercialization [5]. The global impact of biotechnology on healthcare, agriculture, and environmental sustainability necessitates continuous updates to intellectual property laws.
For academic institutions to foster research and innovation, raising awareness of intellectual property (IP) is crucial. While academics and students often conduct groundbreaking research, a lack of knowledge about intellectual property rights (IPR) can lead to unintentional violations, ownership disputes, and missed opportunities for commercialization [6]. Existing studies indicate that students

exhibit significant knowledge gaps, particularly regarding digital copyright laws, patent protections, and the ethical considerations of AI-generated works, whereas faculty members generally have a foundational understanding of IPR [7].

This study explores the broader impact of emerging technologies on intellectual property frameworks and assesses the level of IPR awareness among faculty and students. By conducting a comprehensive analysis of survey data, case studies, and legal research, the study aims to identify current knowledge gaps, propose effective instructional strategies, and recommend policy measures to strengthen IPR enforcement in the digital era [8]. Collaboration among academic institutions, policymakers, and industry leaders can help establish a legal and technological framework that safeguards intellectual property while fostering creativity and innovation.

LITERATURE REVIEW:

ThetransformativeroleofnewtechnologieshasbeenemphasizedinIPRresearch.Recentstudies show The transformative impact of emerging technologies has been a key focus in IPR research. Recent studies indicate that blockchain enhances security and transparency in copyright management [2], biotechnology introduces ethical and legal complexities to patent laws [3], and artificial intelligence [1] challenges traditional notions of authorship and ownership. Additionally, the rise of decentralized platforms has created new challenges related to content ownership and commercialization [4,5].

Chowdhury Ghosh [1] extensively examines this issue, emphasizing how AI-generated content disrupts established copyright frameworks. Her research argues that legal structures must evolve to address the question of whether AI should be granted authorship rights or if ownership should be assigned to AI developers, consumers, or businesses utilizing these technologies. The study also highlights concerns such as automated plagiarism and AI-generated deepfakes, which further complicate copyright enforcement.

Chambers (cited in Chowdhury Ghosh) [2] explores the growing use of blockchain in intellectual property management. By enabling smart contracts, blockchain facilitates automated licensing agreements and real-time royalty distribution. This advancement has the potential to transform copyright enforcement by giving authors and creators greater control over their works, reducing unauthorized use, and decreasing reliance on intermediaries such as publishers and legal agencies.

Similarly, a study by Khayyat et al. [5] examined IPR awareness in universities, revealing substantial gaps in students' understanding of copyright and patent laws. These findings underscore the need for institutional initiatives to enhance IPR education.

RESEARCH METHODOLOGY:

A mixed-methods approach was used to assess IPR awareness among faculties and students. A structured survey was conducted in academic institutions to evaluate knowledge levels, perceptions, analysis of legal frameworks and case studies was performed to assess the impact of AI and blockchain on traditional IPR laws [1,5]. Primary data was collected through an online survey to gather data about the awareness level of intellectual property.

DATA ANALYSIS:

The gender distribution included 46 female and 27 male respondents. Among them, 60.3% had never attended an IPR workshop, whereas 39.7% had participated in relevant programs. The sample questions of online forms and survey results are presented the following charts:

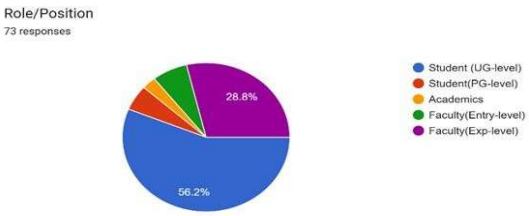

Fig1:Categories of responses Jobs(Academics/ Faculty and Students)

The study surveyed 73 participants includes 41(56%) undergraduate students, 21(29%) experienced faculty members, 5(7%) entry-level faculty members ,4(6%) postgraduate students and 2 (2%) academic researchers

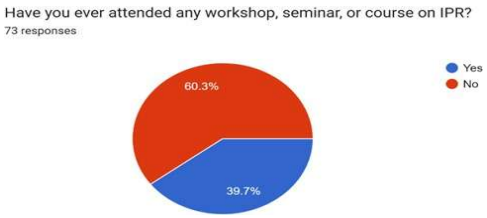

Fig.2.Percentage of the answers to the question“Have you ever attended any workshop,seminar, or course on IPR?".
Figure 2 shows that there 44(60.3%ofthe participants) have attended any workshop, seminar, or course on IPR;While 25(39.7%)ofthe participants) said not attended any workshop, seminar, or course on IPR.

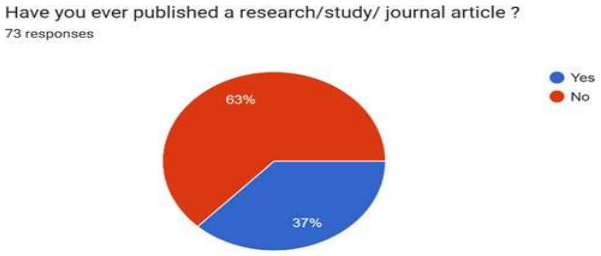

Fig. 3. Percentage of the answers to the question “Have you ever published a research/study/ journal article?".
Figure 3 shows that there 46(63% of the participants) have published a research/study/journalarticle;
While 27(37% of the participants) have not published.

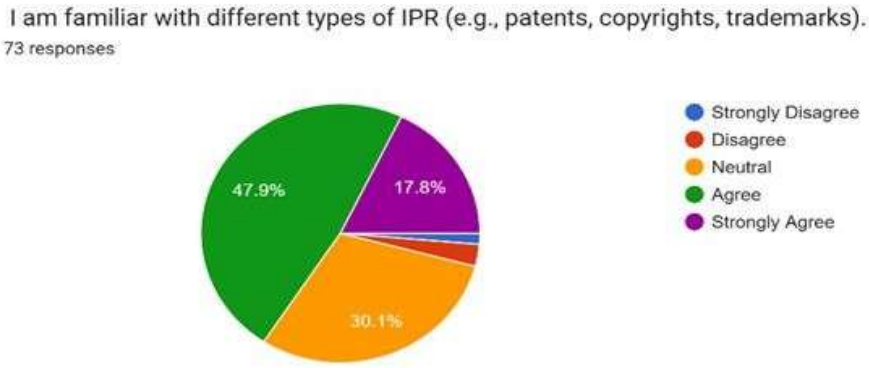

Fig. 4. Percentage of the answers to the question "I am familiar with different types of IPR (e.g., patents, copyrights, trademarks)."

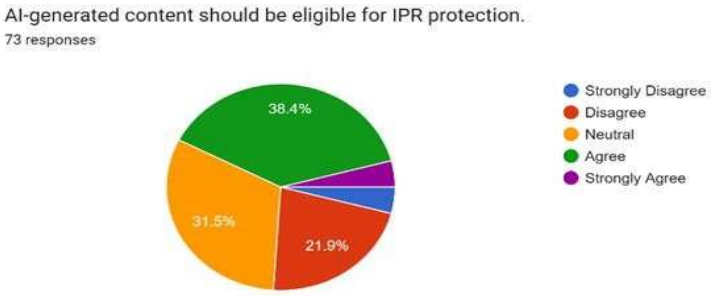

Fig.5.Percentageofthestatement"AI-generatedcontentshouldbeeligibleforIPRprotection"in a scale Figure5showspercentagewhoansweredthisquestion."A**I-generatedcontent**shouldbeeligible forIPRprotection"inthescalewhere3%stronglyagree,21.9%Disagree,31.5areneutral,38.4% of the participants Agree ,3% strongly disagree, have published a research/study/ journal article; While 27(37% of the participants) have not published.

KeyResults of Survey

IPRfamiliarity:17.8%ofrespondentsstronglyagreedand47.9% saidtheywere familiar withthevariousformsofIPR.Nonetheless,30.1%hadnoopinion,suggestingknowledge limitations.

IPRinAcademics:Ofthosesurveyed,43.8%agreedand35.6%stronglyagreedthatIPR is essential for scholars and researchers.

AI-GeneratedContent:While31.5%ofrespondentswereneutral,38.4%ofrespondents believedthatAI-generatedcontentshouldbeprotectedbyIPR.

Unauthorized Digital Sharing: 36.9% of respondents were neutral, while 39.7% of respondents saw unlawful digital sharing as an IPR violation.

ADDITIONAL INSIGHTS :

IPR Awareness by Gender:

- Male and female respondents exhibit similar levels of awareness, though males show a slightly higher percentage of strong agreement regarding IPR awareness.

Impact of Research Publication on IPR Awareness:

- Individuals who have published research demonstrate greater IPR awareness, with higher levels of agreement.
- Those without research publications tend to have more neutral or disagreeing responses, indicating a lack of direct exposure to IPR.

Plagiarism as an IPR Violation:

- The majority of respondents recognize plagiarism as a violation of IPR.
- Some neutral responses suggest that not everyone fully associates plagiarism with IPR regulations.

Furthermore, a qualitative content analysis of legal frameworks and case studies was conducted to evaluate the influence of AI and blockchain on conventional IPR laws [1].

FINDINGS AND RECOMMENDATIONS :

Integrating IPR Education: Universities should incorporate dedicated IPR courses and business curricula to enhance student awareness [4,5].

Strengthening Legal Frameworks: Updating regulations to address AI-generated content and decentralized ownership models [3].

Promoting IPR Research: Academic institutions should encourage studies on the intersection of technology and intellectual property law to guide policy development [1,5].

Utilizing Technology for IPR Management: Businesses and institutions should integrate blockchain and AI tools to enhance transparency and security in IP management [2].

AI and Copyright: AI-generated content challenges existing legal definitions of authorship, as current frameworks struggle to determine AI's role as a creator [3].

Blockchain and Intellectual Property: Decentralized systems offer a secure method for tracking ownership and preventing copyright infringement in digital environments [2].

Biotechnology and Patent Laws: The patenting of genetic material remains a topic of debate, particularly concerning accessibility and ethical considerations [4].

CONCLUSION:

Intellectualpropertyprotectionhasbothopportunitiesandchallengesinthedigitalage.Increasing knowledge among educators and students is crucial to encouraging adherence to the law and cultivatinganintellectualproperty-respectingsociety.Theseproblemscanbecreativelysolvedby emerging technology, but ongoing legal developments are necessary to stay up with the rapid changes in the digital world.

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