THE ROLE OF TURNITIN IN MAINTAINING ACADEMIC INTEGRITY: A BACKGROUND STUDY ON LARGE UNIVERSITIES IN LAHORE, PAKISTAN

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Abstract
This study selected large size universities from Lahore, Pakistan to find out the role of one of the text matchings softwares "Turnitin" in maintaining the academic integrity. The major objective of this study was to explore the role of text matching software in maintaining academic integrity. One hundred and ninety-two faculty members from selected universities having instructor's account of Turnitin who participated in this study through their responses. A Quantitative research design followed by survey method was opted to conduct this study and self developed questionnaire was used for data gathering. Results of the study enlightened that text matching software Turnitin is playing significant role in maintaining academic integrity. The use of text matching software (Turnitin) strengthens the academic integrity among academic institutions as well as maintains quality of work and improves writing skills among researchers. Significant positive effects of research skills, use of Turnitin, expectation of Turnitin were found on academic integrity while negative effect of training need was seen on academic integrity.
Key Words: *Text-matching software, Higher education, Pakistan, South Asia, Academic Integrity, Academic Dishonesty*

Background

Academic integrity is growing area of interest for researchers and many studies (Hapsari, 2020; Kaktiņš, 2019; Lee & Edwards, 2013) it had been considered to explore. Plagiarism is one of the common aspects which damages academic integrity and we found many preventive measures taken by the academicians for reduction of plagiarism which is undoubted a major concern of academic integrity. Stoesz and Eaton (2022) extracted from various policy documents of publicly-funded universities in Canada that punitive measures are being applied on academic institutions to decrease academic misconduct and they recommended revision in plagiarism policies for more effectiveness. This paper is an attempt to deal with a very common practice 'plagiarism' which is one of the harmful factors of affecting academic integrity. Academicians and researchers are well aware with the word "Turnitin". It is a text matching software which helps in identifying the originality and purity of the literary work done by any author in textual form. Copying, stealing, incorrect citations and showing someone else's work as own are some different forms of plagiarism which is seriously against the academic integrity. It can be done through different sources; i.e. books, journals, newspapers, internet, online databases and other's work etc. According Zhao et al. (2021) academic dishonesty is "Intentionally carrying out forbidden behaviors to gain an unfair advantage in an academic context and it includes behaviors such as cheating on examinations, copying others' homework or assignments, and plagiarism". Kibler (1988) defined academic dishonesty as "forms of cheating and plagiarism that involve students giving or receiving unauthorized assistance in an academic exercise or receiving credit for work that is not their own". With the emergence of internet and digital resources it has become easier for the students and researchers to plagiarize conveniently for the completion of their intellectual works which is damaging the academic integrity. Liang et al. (2021) said that students are unaware about the plagiarism policies and confused in understanding it. Stoesz et al. (2019) narrated that in Canada, proper specific language related to contract cheating is absent from the policy documents and no clarity exists in definition of plagiarism. Weber-Wulff (2016rrated that a number of students tend to submit their work with full of plagiarized material and claim it their own. It is a decisive matter for all types of academic institutions to maintain academic integrity for their morality. McCabe (2003) stated in his study that academic dishonesty in term of plagiarism has increased among researchers in the previous few years.

Statement of the Problem

Because of technology it is simply easy to plagiarize (Stowers & Hummel, 2011). Wide spread available information on internet has affected the academic integrity by enhancing convenience and flexibility for copying or cheating. Szabo and Underwood (2004) explored that more than 50% students copy from internet to prepare their assignments and do not cite properly while they also do not consider this practice as plagiarism. Plagiarism is being considered most sensitive issue in academia (El-Muwalla & Badran, 2020).

This academic dishonesty is harmful for the creative writing skills as well as research skills of students and researchers which is damaging repute and academic integrity of educational institutions. Different measures have been taken to identify the originality of

work by Higher Education Commission of Pakistan to uphold the uniqueness in research works. For this purpose, Turnitin text matching software was implemented among the Higher Educational Institutions of Pakistan. As according to many researches plagiarism is increasing with the passage of time and damaging the academic integrity. Is anticipation of Turnitin maintaining academic integrity? As it is major problem for academic institutions. So, this study intended to explore the role of Turnitin in maintain academic integrity.

Purpose of the Study

Plagiarism is worth taking phenomenon that is being considered as a serious issue related to academic integrity around the world and it is growing day by day (Krou et al., 2021). As Batane and Tshepo (2010) said that due to increase of internet and computers academic dishonesty is increasing. Even in the past plagiarism was a major issue in academia which remained under consereation to the researchers and academicians and detecting it is still difficult for faculty and academicians (Muwalla & Badran, 2020). According to McCabe, Trevino and Butterfield (2001) percentage of plagiarism has been increasing over the years.

So this fact provoked the world to take action against the injurious academic misconduct. The world taking initiatives for defeating plagiarism by using various tools and services. In Pakistan Turnitin is being used by academic world to detect plagiarism for promotion of academic honesty. The integral purpose of the study is to explore the role and effectiveness of Turnitin in reductions of plagiarism and in maintaining the academic integrity in local Pakistani context.

Research Questions

In this study it would be strived to address the following questions on the basis of faculty members; opinions that what they think about;

- Does plagiarism damage the academic integrity?
- Does Turnitin help to strengthen the academic integrity among universities?
- Does Turnitin help to maintain the quality of research work?
- Does Turnitin reduce the habit of copying and stealing literary material?
- Does Turnitin help in improving creative writing skills among students/ researchers?
- Does Turnitin help in enhancing research skills among students/ researchers?
- To what extent Turnitin is reliable for maintaining academic integrity with respect to detecting plagiarism?

Significance of the Study

In the competition of higher educational institutions (HEIs), major influence is being given to quality of research which is integrated with academic integrity. In Pakistan, HEC is laying stress on research and even awarding up to 40 % marks in the areas [1]of

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[1] https://hec.gov.pk/english/universities/Documents/Ranking_Doc%20(2015).pdf

research for rating the HEIs in Pakistan. To purify and un-plagiarize research, text matching software Turnitin is being used over the country on the recommendations of HEC. This study has significant value in this regard that previous studies and researches had been conducted on perceptions, use, and awareness about the Turnitin in local context while this study try to ascertain the role of the software in maintaining academic integrity on the bases academician's opinion. It is also significant due to its nature and type in context of eradicating academic dishonesty through Turnitin and the effectiveness of the software being implemented over the HEIs. Moreover, remembering that it is not the purpose of the study to promote the software.

Literature Review

Plagiarism afflicts not only the integrity of persons but also the fame of organizations and is destructive for the growth of a person as well as organizations. So it is imperative to identify and take steps against such activities for sake of organizational fame and integrity as well as to improve person's literary aptitude. Hapsari, Ghali and Ammar (2020) narrated that academic integrity builds students' character which become formal part of their life and Turnitin can be helpful for teachers in teaching academic integrity. Walker (1998) expresses that universities are more attentive in preparing policies to promote student's awareness concerning plagiarism. In the present epoch of information flow and global world ideology, the chances of copying or showing anyone else's work as own are very high. Kenny and Eaton (2022) mentioned that academic institutions are emphasizing on the importance of academic integrity. To check the originality of the work and to identify whether it is really done by the claimant is a major issue. To settle down such issues and maintain academic integrity many text matching softwares were introduced but now a days Turnitin looks prominent among these (Abrahamson & Mann, 2018; Muwalla & Madran, 2020; Vera et al., 2018). In 1997 four university students developed a peer review application that was based on internet based licensed website for detecting plagiarism (Muwalla & Badran, 2020). In recent years, the software has gained popularity in the world (Mphahlele & McKenna, 2019) as well as in Pakistan. This software is being used for detect plagiarism as well as for formative self-assessment (Zaza & McKenzie, 2018). There were two reasons to choose this software for study. The first is that, in Pakistan Turnitin is being introduced and launched among Higher Education Institutions (HEIs) through Higher Education Commission (HEC)[2] and secondly, it is the only software which is being unanimously used in Pakistani HEIs. Heberling (2002) stated that because of student's cheating it is challenge for both online and traditional education systems to maintain academic integrity.

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[2] https://www.hec.gov.pk/english/services/faculty/Plagiarism/Pages/default.aspx

Awareness related to any phenomenon is very important which enables stakeholders to be knowledgeable about the impact of that phenomenon. Awareness about plagiarism and its detecting tools can help the researchers to be preventive it. Kaktins (2019) explored that majority of respondents from Australian universities were aware of the plagiarism and text matching software Turnitin. Ramzan, Munir, Siddique and Asif (2012) explored the level of understanding about plagiarism among graduate and post graduate students and found low level of awareness among students about plagiarism, universities' plagiarism policies and process. Shirazi, Jafarey and Moazam (2010) elaborated that plagiarism is an expanding issue for Pakistani academic institutions and damaging academic integrity. Ali, Ismail and Cheat (2012) stated that plagiarism is a disreputable act and should be eliminated from student's mind.

Plagiarism can be overcome among students, teachers and researchers by adaptation and awareness about plagiarism avoiding techniques and academic integrity can be augmented (Saeed & Ahsan 2015). If students are informed at an early stage about plagiarism, policies about it, legal consequences and academic integrity, it can be constructive for them (Babalola, 2012; Samuels & Bast, 2006). Ford and Hughes (2012) narrated that awareness about plagiarism, academic integrity and use of plagiarism checking software can help to improve academic integrity. Macleod and Eaton (2020) explained that plagiarism is worsening problem at Canadian institutions and teachers can play pivotal role in reducing it by implementing institutional policies.

Marcus and Beck (2011) conducted a study in Queensborough Community College and concluded that 50% of respondents were not aware about the plagiarism, academic integrity and guidelines about cheating. The authors recommended faculty development programs for plagiarism awareness and to maintain academic integrity. Gallant et al. (2019); Zulfiqar et al (2011) described that due to unawareness of plagiarism, its types and Intellectual Property Laws, researchers become victims of plagiarism which is committed sometimes intentionally and sometimes unintentionally. Dawson et al. (2019) prescribed in their study that plagiarism arises when students outsource their work.

Kaktins (2019) conducted a study in Australian universities and explained that plagiarism is major challenge for them which afflicts the academic integrity and they found that teachers considered Turnitin as a partial solution for addressing this phenomenon in true spirit. Another old studying Australian context Joyce (2007) stated that cheating and plagiarism are major concerns of academic integrity, which are being settled in Australia mostly by using online detecting mechanism and Turnitin is one of them which are widely used to tackle this academic dishonesty.

Abrahamson and Mann (2018) narrated that Turnitin is effective software which is helpful in improving quality of research work. Holi (2013) pointed out in his study that Turnitin is widely used for detecting plagiarism and it is playing an important role in maintaining academic integrity while regarding its limitations there were no many limitations of it and it is perceived as positive and effective software. Foltynek et al. (2020) stated that detecting plagiarism is an active approach in research field and in recent years automated detection is being used. Waigand (2019) presented that Turnitin is common software in world to detect plagiarism.

Batane (2010) in his study articulated Turnitin reports from various institutions" in which he prescribed that University of Colorado realized that academic integrity is suffering due to plagiarism. Easy access of internet resources is the major cause of plagiarism globally as well as in Pakistan while people are unaware about plagiarism and its forms. Those who are well aware about proper referencing, citation, paraphrasing and plagiarism and have publications discourage the plagiarism (Shirazi, Jafarey & Moazam, 2010). Commonly agreed upon motivations for plagiarism are family expectations, course deadlines, scholarship, hated required course, employment pressures for required grades, and feeling invulnerable. Students do not manage their time well and have problems with deadlines. In a digital age, it is easy to believe, no one will know, if you plagiarize (Thompson & Carol, 2006; Walker, 2010). Eaton (2020) narrated in her report that in University of Calgary, the integrity hour was introduced to facilitate the community of practice about handling the academic integrity issues during COVID-19. The purpose of this facility was to make aware of and handle the changing nature of academic breaches and misconduct.

Sulehri, Chaudhry and Qadeer (2017) narrated that Turnitin is playing supportive role in e-learning academicians which leads them towards prevention of plagiarism. Ayon (2017) and (Mphahlele & McKenna, 2019) portrayed that although Turnitin is considered as good deterrent to plagiarism but not fully eliminate it while many teachers do not prefer to use. Turnitin. Bruton and Childers (2016) stated that increase in use of plagiarism detection software Turnitin has been seen in university teachers. Technology and software used for detection of plagiarism were analyzed which show the concerns of experts and academicians to this worth taking dishonesty (Potthast, et al., 2013).

Holi (2013) narrated in his study that most of respondents perceived Turnitin positively and believed that the software is more effective in detecting and minimizing plagiarism. According to Muwalla and Madran (2020) Turnitin is one of the most popular and well-known anti-plagiarism software adopted by more than 26 million registered users having student of instructor accounts, reached more than 500 million submissions and more than 15000 academic institutions are using it for detecting plagiarism in the world. While according to Vera et al. (2018) Turnitin is being used by 30 million students in 140 countries and available in 18 languages. It has been reported that Turnitin reduced online plagiarism up to 35% as well as being adopted as e-Blackboard for sake of instructional tool and integrated learning system (Lee, 2011). In recent years to address the problem of plagiarism many studies (Daoud et al., 2019; Hapsari et al., 2020; Lee & Edwards, 2013; Muwalla & Badran, 2020) nationally and internationally conducted by the researchers which establish the importance of Turnitin in maintaining academic integrity.

Various books, articles and journals are available which provide insight and deals with a variety of aspects of plagiarism. Presentations, workshops/ conferences, online discussions, and blogs are also available for awareness and providing guidance in order to promote ethical writings (Piracha, 2011). Daoud, Alrabaiah and Zaitoun (2019) narrated that with the advent of internet breach of academic integrity has become easier but with the usage of Turnitin ratio of plagiarism decreases among students. It is considered that software can better and easily detect plagiarism as compare to human (Foltynek et al., 2020).

Soroya, Hashmi and Soroya (2014) said in their research that foundation of scholarly and academic world is upon new theories, ideas, experiments and research, which should be enhanced by developing student teacher relationship to promote academic integrity and reduce dishonesty. McCabe (2003) explored that plagiarism is most widespread issue today as students not consider copying from internet as plagiarism. Park (2003) stated that increasing access of internet and digital resources promoted plagiarism among students which should be addressed and penalties must be awarded to culprits. Mulcahy and Goodacre (2004) elaborated that plagiarism damages the academic integrity and Turnitin helps to maintain it.

Literature Gap

A few studies in Pakistani perspective are available on academic integrity especially narrating the role of plagiarism checking software in maintaining the academic integrity. Some studies from local context explain awareness level about plagiarism. Studies from the non-English courtiers should be reflective in the literature. Hence, this strives to portray the Pakistani context regarding role of text matching software in reducing plagiarism which is a major ingredient of academic integrity.

Methods

Aim, design, and setting of the study

The major objective of this study was to explore the role of text matching software in maintaining academic integrity.

Four large size degree awarding universities from Lahore were selected for the study. Two universities were from Public Sector, University of the Punjab (PU) and Government College University (GCU) while two universities were from Private Sector, University of the Central Punjab (UCP) and University of Management & Technology (UMT). All the universities are recognized by Higher Education Commission of Pakistan having degree awarding status. Faculty members from these four universities having instructor's account in Turnitin were the population of the study.

To complete this study, the quantitative research method was adopted followed by survey research design. Data were collected by self structured questionnaire from the faculty members of selected universities. To find out the reliability and validity of the tool, expert opinion and pilot testing from 11 faculty members who were not part of the study were conducted. The value of cronbach alpha remained 0.811 which is considered as "good" to ensure the reliability of the instrument. The tool was developed by keeping in view the previous literature and objectives of the study and small changes on the suggestions of experts were made to finalize the tool. Factor analysis test was conducted to check validity of the instrument (questionnaire).

Data gathering and analysis

For data gathering a fixed number of questionnaires (70 each university) were distributed among the faculty members having Turnitin accounts through personal visits. There were 192 faculty members who participated in the study as respondents. Hence 68.57 % was the response rate. Descriptive and inferential statistical tests were applied.

Further, it is explained for the readers and experts regarding approval of "Ethics Board" to conduct this study. There is no any board available in Pakistan from where the researchers may obtain approvals for writing a research paper. Approvals from Ethics Boards are only considered in Pakistan for writing a thesis and the approvals are granted from the respective boards of universities to the thesis students only.

Results

The use of text matching softwares plays a significant role in maintaining academic integrity and this study has explored the role of Turnitin. Frequency analysis of the demographic characteristics and views related to Turnitin, descriptive analysis for the responses of all items, inferential analysis, exploratory factor analysis (EFA), bivariate correlation analysis and regression analysis of the data were conducted with statistical package for social science (SPSS). Detailed description about the results of every question related to the study is presented in form of text, tables and graphs. There were 192 respondents of the study who gave their opinions.

Validity Analysis

Exploratory Factor Analysis (EFA) of all the questions was conducted to see the validity of the components. Table 1 shows that 5 factors; Academic integrity, Research skills, Use of Turnitin, Expectation from Turnitin and Need Training were extracted from the 21 items. Due to negative and cross loadings, 6 items were removed having serial numbers 1, 3, 5, 9, 13, 21. The rotated component matrix or loadings are the estimates of the correlations between each of the questions and the extracted factors (components). There were medium-to- high correlations between the 6 academic integrity questions as factor 1. The correlations between all other questions and the factor 1 were very low. The correlations less than 0.3 were observed as insignificant and ignored. There were medium-to-high correlations between the 3 research skills questions as factor 2. The correlations between all other questions and the factor 2 were very low. Similar findings for the remaining factors were observed.

Table 1 : *Rotated Component Matrix for Factor Analysis*

Rotated Component Matrix[a]					
	Component				
	1	2	3	4	5
Detect Plagiarism	.826				

Turnitin Minimize Plagiarism	.801				
Raised Awarness about Plagiarism	.801				
Adoption Turnitin Reduces Plagiasrism	.789				
Stengthened Academic Integrity	.742				
Turnitin Should Mandatory	.625				
Promote Writing Skills		.839			
Improve Research Skills		.771			
Learning Citation/ References		.758			
Turnitin Help to rephrase			.836		
Easy to generate report			.739		
Expanding use of Turnitin			.536		
Images, ill should support				.807	
Oriental language support				.734	
Need Training					.889

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 5 iterations.

Correlation Analysis

Bivariate correlation analysis of the extracted five factors was conducted and the results indicates that all the factors are significantly correlated to each other as *p*-values of the constructs are less than 0.05 as indicated in Table 2.

Table 2: *Correlations among factors*

Correlations

		AcademicIntegrity	ResearchSkill	UseOfTurnitin	ExpectationOfTur	NeedTraining
AcademicIntegrity	Pearson Correlation	1	.508**	.279**	.284**	.199**
	Sig. (2-tailed)		.000	.000	.000	.006
ResearchSkill	Pearson Correlation	.508**	1	.190**	.176*	.145*
	Sig. (2-tailed)	.000		.008	.015	.045
UseOfTurnitin	Pearson Correlation	.279**	.190**	1	.301**	.167*
	Sig. (2-tailed)	.000	.008		.000	.021
ExpectationOfTur	Pearson Correlation	.284**	.176*	.301**	1	.215**
	Sig. (2-tailed)	.000	.015	.000		.003
NeedTraining	Pearson Correlation	.199**	.145*	.167*	.215**	1
	Sig. (2-tailed)	.006	.045	.021	.003	

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Demographical Representation

Table 3 shows that there were 68 (35.4%) respondents from PU, 40 (20.8%) from GCU, 42 (21.9%) from UCP and 42 (21.9%) from UMT. A well-balanced response rate from male respondents 100 (52.1%) and 92 (47.9%) from females represents the strength of the results in term of opinions from both sides. The other demographic representations are depicted in table 1.

Table 3: *Respondent's characteristics*

Variables		Frequency	Percentage
University	PU	68	35.4
	GCU	40	20.8
	UCP	42	21.9
	UMT	42	21.9
Gender	Male	100	52.1
	Female	92	47.9
Designation	Professor	16	8.3
	Associate Professor	18	9.4
	Assistant Professor	63	32.3
	Lecturer	84	48.8
	Other	12	6.3

Regarding experience, the data represents that approximately all respondents have enough experience of teaching as well as publishing which means, they are using Turnitin and it is expected that before submitting for publications they checking their plagiarism while all the respondents of the study have an account in text matching software Turnitin. The respondent's status is shown in Table 4.

Table 4: *Respondent's status*

Variables		Frequency	Percentage
Teaching Experience	Less than 1 Year	6	3.1
	1-3 Years	40	20.8
	4-6 Years	52	27.1
	7-9 Years	32	16.7
	More than 9	62	32.3

	Years		
	None	30	15.6
	1-3	90	46.9
Research Pub. In Last 3 Years	4-6	32	16.7
	7-9	14	7.3
	More than 9	26	13.5
Account in Turnitin	Yes	192	100
	No	0	0

Table 3 displays that respondents are using text matching software Turnitin at professional level and narrated that their majority of students are aware of the software, its usage and its functions.

Table 3: *Respondent's views related to Turnitin*

Variables		Frequency	Percentage
	Less than 1 year	26	13.5
	1-2 years	30	15.6
Using Turnitin	3-4 years	70	36.5
	5-6 years	32	16.7
	More than 6 years	34	17.7
Received Turnitin Training	Yes	88	45.8
	No	104	54.2
Students aware of Turnitin	Yes	166	86.5
	No	26	13.5

Students aware with functions of Turnitin	Yes	112	58.3
	No	80	41.7

Regression Analysis

A multiple regression analysis was carried out to find the impact of independent variables (Research Skills, Use of Turnitin, Expectation from Turnitin and Training Need) on the dependent variable (Academic Integrity). From Table 5, the result of ANOVA test shows that the *p*-value of F-test statistics is .000, so overall model is significant.

The unstandardized coefficient of research skills is 0.341, which means as research skills increases one unit the academic integrity increases 0.341 units so there is positive significant effect of research skills on academic integrity. Hence, research skills significantly affect the academic integrity as *p*-value is .000 <0.05. The unstandardized coefficient of Use of Turnitin is 0.154, which means, when use of Turnitin increases one unit the academic integrity increases 0.154 units as there is positive significant effect of use of Turnitin on academic integrity as *p*-value is .034 <0.05.

The unstandardized coefficient of Expectations from Turnitin is 0.149 which means as Expectations from Turnitin increases one unit then Academic Integrity increases 0.149 units due to positive effect of expectation from Turnitin on Academic Integrity. Expectations from Turnitin significantly affect the Academic Integrity as *p*-value is .024 <0.05. The unstandardized coefficient of Need Training is 0.063 which means as Training Needs increases one unit then Academic Integrity decreases 0.063 units because there is negative effect of training needs on Academic Integrity as *p*-value is 0.200 >.05.

Table 5: ANOVA and Coefficients from Regression analysis

ANOVAᵇ

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	36.132	4	9.033	22.137	.000ᵃ
	Residual	76.307	187	.408		
	Total	112.439	191			

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a. Predictors: (Constant), Need Training, Research Skills, Use of Turnitin, Expectation of Turnitin

b. Dependent Variable: Academic Integrity

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.155	.216		.717	.474
	Research Skills	.341	.048	.444	7.146	.000
	Use of Turnitin	.154	.072	.137	2.137	.034
	Expectation of Turnitin	.149	.065	.147	2.278	.024
	Need Training	.063	.049	.080	1.287	.200

a. Dependent Variable: Academic Integrity

Discussion

Academic integrity is a cornerstone of the educational landscape, essential for maintaining the credibility and authenticity of scholarly pursuits. In recent years, the emergence of text matching software has transformed the way academic institutions address plagiarism and unethical practices. One such prominent tool is Turnitin, which detects instances of copied content, cheating, and plagiarism. This article delves into a comprehensive exploration of a study that sheds light on the efficacy of Turnitin in bolstering academic integrity within educational institutions. The study's findings, implications, and significance in the context of research skills, writing proficiency, research quality, and integrity will be thoroughly examined.

The study's findings unequivocally underscore the pivotal role of Turnitin in fortifying academic integrity within academic and research settings. The diverse functions and features of this software significantly contribute to this achievement. Notably, the majority of respondents from the selected institutions express confidence in Turnitin's reliability for maintaining academic integrity. This level of trust is further highlighted by the majority opinion that Turnitin should be made mandatory for all forms of research. The

study's outcomes underscore that such software tools serve as critical deterrents against plagiarism, copy-pasting, and cheating, ultimately fostering research skills, writing proficiency, the overall quality of research, and research integrity.

Turnitin's significance extends beyond detecting instances of academic misconduct. The software empowers researchers and students by enhancing their understanding of proper citation practices and the importance of originality. By analyzing similarities between submitted work and existing sources, Turnitin encourages a deeper engagement with source material, thus nurturing robust research skills. Additionally, the software prompts writers to improve their paraphrasing techniques and grasp the nuances of appropriate referencing. This emphasis on responsible writing cultivates a generation of scholars who are well-versed in ethical research practices and adept at producing original content.

The study's emphasis on Turnitin's impact on research quality is noteworthy. By discouraging unethical practices like plagiarism, the software contributes to elevating the overall standard of research work. Turnitin's ability to identify and highlight copied content prompts researchers to strive for originality and rigor in their work. Consequently, the academic community benefits from a more robust body of knowledge characterized by credibility, accuracy, and innovation. This aligns seamlessly with the broader mission of academic institutions to produce research that contributes meaningfully to their respective fields.

The alignment of the study's findings with prior research lends robust support to the efficacy of Turnitin in preserving academic integrity. Studies conducted by Holi (2013), Stapleton (2012), Ford and Hughes (2012), Babalola (2012), Lee (2011), Marcus and Beck (2011), Cheema and Walker (2010), Batane (2010), Samuels and Bast (2006), Mulcahy and Goodacre (2004), and Cheema et al. (2011) collectively emphasize the consistent positive outcomes associated with the implementation of Turnitin. This convergence of results underscores the universal applicability of Turnitin in fostering ethical research conduct and upholding academic standards.

Statistical testing of five constructs of the study indicate that Turnitin software is maintaining academic integrity among Pakistani universities while it was also revealed that if there will be less awareness about usage and functions of the software, academic integrity will suffer.

One of the researchers personally visited to gather data from the respondents to get maximum responses but many of the participants did not return the filled questionnaires due to certain reasons. This is the limitation of the study that approximately 31 percents faculty members not responded with their options while a practical way out was adopted for the data gathering. Secondly, some percentage of respondents (approximately 6 %) was not the full-time faculty members and they might be Teaching Assistants/ Associates (TAs), Researchers and Librarians.

Conclusions and Recommendations

Based on the results of the study and respondents' opinions and thinking about the role of Turnitin in maintaining academic integrity, no difference was seen in opinions of male and female respondents that plagiarism damages the academic integrity. The use

of text matching software (Turnitin) strengthens the academic integrity among academic institutions as well as maintains quality of work and improves writing skills among researchers. Significant positive effects of research skills, use of Turnitin, expectation of Turnitin were found on academic integrity while negative effect of training need was seen on academic integrity. Therefore, four aspects are important for maintaining academic integrity in context of plagiarism occurrence. A well augmentable finding (negative effect of training need on academic integrity) shows that if there will be less use, less expertise, insufficient knowledge or awareness about software and need more training to handle which need more time to be an expert user of the software can be prove as negative aspect of academic integrity.

There is many software available which help in detecting plagiarism or text matching which should be considered by the researchers and academic institutions. It is recommended to the academic and research institutions to declare the use of any plagiarism checking software compulsory for maintaining academic integrity. Governing bodies of educational institutions like HEC and UGC should make policies for the implementation of the plagiarism checking software in universities and colleges. Regular trainings and awareness sessions for faculty and students regarding academic integrity should be arranged. At initial level assignments and term papers should be checked through text matching software and their reports should be shared with students so that they become more aware that their work will be checked through some software that detects the copied material. Punishments in term of different kind of penalties to the offenders can also play an important role in maintenance of academic honesty. Turnitin should also include the facility of checking the images and oriental languages-based documents. Therefore, it is dire need that researchers should pay special attention to this worth taking phenomenon and give their input in this area on the basis of their research. At the end, it is also recommended that HEC should also consider some other reliable plagiarism checking software.

List of Abbreviations
Higher Education Institutions (HEIs), Higher education commission (HEC)
Declarations
Ethics approval and consent to participate: not applicable
Consent for publication: not applicable
Availability of data and material: The data is given in the paper
Competing interests: No conflict of interest regarding the paper

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Appendix A: Questionnaire

Is Turnitin maintaining Academic Integrity?

Questionnaire

Dear Sir/ Madam,

I am an M.Phil student and conducting research on Turnitin Software which is being utilized in the universities of Pakistan. You are requested to respond to the following questions. This questionnaire will take scarcely 15-20 minutes to be filled in. This research will be beneficiary for academic institutions, especially for those universities which are trying to maintain academic integrity through Turnitin. It is ensured that data received by you will be kept confidential and only will be used for research purposes.

Q-1: Your Institute/ University: _____

Q-2: Gender
   a) Male   b) Female

Q-3: Your designation.
   a) Professor   b) Associate Professor   c) Assistant Professor
   d) Lecturer   e) Any other (please specify) _____

Q-4: Your teaching experience.
   a) Less than 1 year   b) 1-3 years   c)3-6 years
   d) 6-9 years   e) More than 9 years

Q-5: Your Research publications in last 3 years. (Conference, workshop, journal, etc.)
   a) None   b) 1-3   c) 4-6
   d) 7-9   e) More than 9

Q-6: Do you know about Turnitin?
   Yes   /   No

Q-7: For how long have you been using Turnitin?
   a) Less than 1 year   b) 1-2 years   c) 2-3 years
   d) 3-4 years   e) More than 4 years

Q-8: Have you received formal training as how to use Turnitin?
   Yes   /   No

Q-9: Do your students have knowledge about Turnitin?

     Yes   /   No

Q-10: Do your students have awareness about the functions of Turnitin?

     Yes   /   No

Q-11: Please tick the relevant box in the following statements as per mentioned scale in each column given below;

Sr.#	Statement	1 Strongly Agree	2 Agree	3 Neither agree nor disagree	4 Disagree	5 Strongly Disagree
1	Plagiarism damages the academic integrity of institutions.					
2	Turnitin helps in minimizing plagiarism among students/ researchers					
3	Students are aware that their work will be checked on Turnitin					
4	Turnitin is useful for learning, how t write reference or citation properly					
5	Turnitin helps to locate the sources, used to complete the assignment or research work					
6	Turnitin is useful for detecting plagiarism					
7	Turnitin has raised awareness among students/ researchers, about plagiarism.					
8	Turnitin has strengthened the academic integrity					
9	Turnitin helps to maintain the quality of research.					
10	Adoption/ awareness about Turnitin reduce the plagiarism.					
11	Turnitin has promoted writing skills among students.					

12	Turnitin helps to improve research skills among students					
13	Turnitin has promoted originality of work among students					
14	Use of Turnitin should be mandatory in all research works to maintain academic integrity					
15	I need more training for better usage of Turnitin.					
16	Penalties to the defaulter(s) can help to minimize plagiarism.					
17	Turnitin is unable to check plagiarism of images like pictures, tables, and illustrations etc.					
18	It is weakness of Turnitin that it does not detect plagiarism in Urdu language					
19	It is easy to deceive Turnitin by doing rephrasing of plagiarized work					
20	Online Grading doesn't support my marking style.					
21	Turnitin should be supportive to check plagiarism in Urdu language.					

Q-12: Please define your usage of Turnitin according to mentioned scale given in the below columns.

Sr. #	Usage	Always	Frequently	Sometimes	Seldom	Never
1	I always use Turnitin to detect plagiarism.					
2	After checking students work in Turnitin, I share originality report with them.					

3	After receiving originality report, students try to eliminate plagiarized material from their work.						
4	I check and mark the assignments using rubrics in Turnitin.						
5	I use Turnitin as e-blackboard.						
6	I check and mention comments about assignments using grade marks.						

Q-13: Is there any policy of plagiarism available at your Institute/ University?

    a) Written Policy   b) Non-Written Policy   c) Policy Not available   d) I don't Know

Q-14: Enlist deficiency (s), which you find in Turnitin.

    _____

    _____

    _____

Q-15: In your opinion, Turnitin is enough to detect plagiarism or any other system is needed.

    a) Turnitin is enough   b) Needed another system

Q-16: If some other system is needed specify, what kind of system should be adopted to detect plagiarism?

_____

_____

_____

_____

_____

_____