



Coaching Collaboration: Training Strategy for Improving the Quality of Scientific Writing

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Abstract: The number of scientific publications published by countries reflects their ability to innovate. The government has made several efforts to encourage the State Civil Apparatus (ASN) to publish innovative scientific papers relevant to the ASN's functional scope of duties. One of these attempts is to provide basic scientific writing training. Basic scientific writing training is designed to accommodate participants from various backgrounds, including age, functional position, and functional position level. This research aims to determine whether cross-generational collaboration, cross-functional positions collaboration, and cross-level functional positions collaboration can produce a better quality of scientific writing content and seminars. This research involved 160 participants in 2023, divided into 80 coaching groups. Data were analyzed using descriptive statistics, boxplots, and cross-tabulation. The data was then analyzed further using ANOVA inferential statistics and Mann-Whitney non-parametric statistics. The results of data processing and analysis show that cross-generation collaboration and cross-level functional position can lead to significant improvements in scientific writing. On the other hand, cross-functional position collaboration delivers comparable results to coaching groups without collaboration. This study is expected to make a significant contribution to improving the quality of scientific papers written by participants with different functional positions, functional position levels, and generations.

Keywords: training strategy, collaborative learning, coaching, collaborative scientific writing

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INTRODUCTION

Technological advancement is inevitable; it has blurred the lines between space and time in the world, and competition between countries has become increasingly intense (Büchel & Spinler, 2024). All countries in the world strive to be superior to others to be able to maintain their existence as sovereign and developed countries. Indonesia has implemented various strategies to increase the nation's competitiveness to realize national development goals as outlined in the National Medium-Term Development Plan (RPJMN) (Triyono et al., 2020). According to the 2023 IMD Global Competitiveness Index (GCI) Report, Indonesia ranks 34th out of 64 countries surveyed. Indonesia's ranking remains lower than its neighbouring countries, such as Singapore, Malaysia, and Thailand. One of the aspects that determines a nation's competitiveness is the ability to innovate, which may be determined by the number of scientific publications produced by a country (Nasir & Zhang, 2024). Based on data released by the website www.scimagojr.com, in 2022, Indonesia's publication position based on the H-Index ranked 59th out of 233 countries below Singapore, Malaysia, Thailand, and the Philippines.

In order to achieve these development goals, the government has attempted to boost the number of scientific publications in Indonesia. Aside from academics, the government encourages ASN to publish innovative scientific papers following its functional positions' duties. Based on the Regulation of the Minister for Administrative Reform and Bureaucratic Reform (PermenpanRB) number 1 of 2023, ASN functional positions are divided into two categories that are Functional Expertise Positions and Functional Skills Positions. Functional Expertise Positions are determined based on their abilities in the cognitive domain, while functional skill positions are determined based on their abilities in the psychomotor domain. Functional expertise positions are leveled based on their professional knowledge and competence qualifications, namely: 1) first expert level, 2) young expert level, 3) intermediate expert level, and 4) main expert level. Meanwhile, Skills functional positions are leveled based on their knowledge and skills qualifications, namely: 1) beginner level, 2) skilled level, 3) advanced level, and 4) supervisory level (Kementerian Pendayagunaan Aparatur Negara Dan Reformasi Birokrasi, 2023).

Several government agencies have taken action to improve scientific writing skills for ASNs within their organizations. One of the methods to increase scientific writing skills competencies is to organize basic scientific writing training in 2023. The goal of the basic scientific writing training is to increase the number of scientific publications affiliated with the institution. Training in writing scientific papers aims to prepare participants to design research, solve research problems, write research results, and publish them (Blanchard & Thacker, 2019). Basic scientific writing training in 2023 combines theory, training, practice, and guidance to ensure participant achieves the learning objectives. Participants were divided into several groups based on their areas of

competence, either it is natural or social sciences. The participants are the state civil apparatus with various functional position backgrounds and functional position levels. Furthermore, the training participants span a wide age range and represent multiple generations. As is known from the State Civil Apparatus Statistics Book December 2022 published by the National Civil Service Agency (NCSA) of the Republic of Indonesia, the age range for ASN is quite large and encompasses various generations. According to generation, ASN is primarily derived from Generation X (Gen X), 41% born in 1965 and 1976, and 48% of Generation Y, also known as the millennial generation, born between 1977 and 1994. Meanwhile, the baby boomer generation born in 1946-1964 is only 6%, and the Generation Z (Gen Z) born in 1995-2010 is 5% (Badan Kepegawian Negara, 2022).

Lancaster and Stillman (2002) state that each generation has different characteristics. For example, baby boomers are optimistic, yet competitive and workaholic. Gen X is a generation that is very independent and has potential. Therefore, they do not rely on others to progress, whereas Generation Y appreciates differences and prefers to collaborate rather than be ordered around (Bourne, 2015). Gen Z is a generation that adapts swiftly to technological advancements and draws a clear separation between work and personal life (Simonyan, 2023). Collaboration between generations in the workplace is unavoidable. Moreover, each generation has values and characteristics that influence their attitudes and behavior (Mahmoud et al., 2021). Trainers need to consider these distinctions in characteristics between generations while planning training strategies that involve generational collaboration to understand the characteristics and added value that each generation has (Racolța-Paina & Irini, 2021).

Participants from the basic scientific writing training are ASN from different generations, including baby boomers to Gen Z. Likewise, participants from the basic scientific writing training also have a range of functional positions, from functional skill position at the advanced level to Functional Expertise Position at the intermediate expert level. Participants across generations and functional positions collaborate in coaching groups to produce scientific publications. Learning using collaborative strategies involves two or more individuals working together to improve skills or to understand a topic more deeply. Training strategies using collaborative learning are known to be effective in increasing learning motivation and a sense of responsibility and providing opportunities for participants to achieve learning goals together (Huang, 2023; Tosun & Alagozlu, 2023). Piaget and Vygotsky revealed that collaborative learning strategies also referred to as collaborative learning strategies, incorporate new paradigms from learning theory, especially constructivism. Collaborative learning is a learning strategy that involves students with various levels of knowledge, experience, abilities, and resources working together in small groups or teams to achieve the learning goal (Zitha et al., 2023).

Although there has been much research on collaboration strategies in learning and interactions between generations in the workplace (Cheruvelil et al., 2014; Yu et al., 2022) and collaborative learning to improve the students' scientific writing (Hasanuddin et al., 2019), there has not been much discussion on coaching collaboration cross-generations, cross-functional positions, and cross-level functional positions as a training strategy to improve the quality of writing scientific papers. In this research, the authors are interested in examining the influence of training strategies with collaborative coaching between functional position, functional position level, and across generations in improving the quality of scientific paper writing. Hence, this study is expected to make a significant contribution to improving the quality of scientific papers written by the Basic scientific writing training participants with different functional positions, functional position levels, and generations.

METHODS

Based on the problem formulation above, this research used the primary source for a quantitative approach (Santoso & Madiistriyatno, 2021). Respondents in this study were participants in basic scientific writing training in 2023 in 4 training batches of 160 participants divided into 80 coaching groups. The instruments used in this research were the result of the evaluation of the content and scientific writing seminars. Data was processed using SPSS 26 and analyzed using descriptive and inferential statistics. Descriptive statistics are presented in cross-tabulations and boxplots and aim to describe the data set without drawing conclusions from the population (Rahman & Kamaliah, 2022). Cross tabulation will show the relationship between several variables more clearly, and boxplots will show the distribution of scientific writing results based on the age/generation of training participants. Inferential statistics, data analysis, and interpretation employ both non-parametric statistical approaches and parametric statistics. Non-parametric statistics were processed using the Mann-Whitney test, which aims to determine whether there is (1) an influence on the results of scientific writing on participants who collaborate across functional positions and those who do not collaborate, and (2) participants who collaborate across functional positions and those who do not collaborate. The response variable is the outcome of the scientific writing seminar in the form of evaluator feedback on the participants' scientific writing, reviewed in 3 categories (ordinal scale): major revisions, minor revisions, and papers ready to submit. The Mann-Whitney test is a non-parametric statistical test used to compare two independent samples, non-

normally distributed and on a nominal/ordinal scale (Adinurani, 2022). On the other hand, parametric statistics use a one-way ANOVA test to determine the influence of general differences in collaboration between generations using the response variables derived from the result of content and scientific writing seminars evaluation. ANOVA is used to compare the averages of several groups of data. If the output results indicate an influence of differences in collaboration, thus more tests are performed to obtain the best grouping results, and one of the further tests is to use LSD (Muhid, 2019).

RESULT AND DISCUSSION

Basic scientific writing training is designed by looking at the characteristics of training participants, with backgrounds from different functional positions, different levels of functional positions, differences in educational backgrounds, and also differences in ages (Bukhari et al., 2021). Based on these distinctions, participants were chosen with comparable characteristics: none of them had scientific publications and had never conducted research activities. Learning strategies are required to meet the needs of diverse participants that can be accommodated well (Leifler, 2020) not only focusing on certain functional positions or certain generations. The following are the demographics of basic scientific writing training participants.

Table 1. Profile of training participants based on functional positions

Functional Position	Gender		Total
	Male	Female	
Budget Analyst	-	1.3%	1.3%
Legal Analyst	0.6%		0.6%
Apparatus Human Resources Analyst	0.6 %	0.6%	1,2%
Food and Drug Analyst		0.6%	0.6%
Archivist		0.6%	0.6%
Head of administrative sub-division		0.6%	0.6%
Pharmacy and food supervisors	14.4%	77.5%	91.9%
Legislation Designer		0.6%	0.6%
Laboratory Assistant		0.6%	0.6%
Computer Administrator		0.6%	0.6%
Trainer		1.3%	1.3%
Total	15.6%	84.4%	100.0%

A total of 15.6% of participants were male, with the functional positions of Legal Analyst, Apparatus Human Resources Analyst, and Pharmacy and Food Supervisor. 84.4% of participants are female and have the functional positions of Budget Analyst, Apparatus Human Resources Analyst, Food and Drug Analyst, Archivist, Pharmacy and food supervisor, Legislation Designer, Laboratory Assistant, Computer Administrator, and Trainer. In the 2023 basic scientific writing training, most participants have the functional position of Pharmacy and Food Supervisor. If we look at the background of these functional positions, the tendency for scientific focus in the scientific papers produced is 6.3% of social scientific papers and 93.75% of science scientific papers. These variations in functional positions will reveal that participants have different skills, such as knowledge, ways of thinking, and points of view in analyzing and solving problems (Obay et al., 2021). With the correct learning strategy and coaching group, participants can participate optimally based on their background and expertise (Kuo et al., 2022). Selection of coaches that are appropriate to the topic of the participant's writing, determination of collaboration in the coaching group, and structure of the training material delivered become a system that together aims to increase participant competency and contribute to overall training success (Jackson & Hurst, 2021). Based on the level of functional position and age, the following is the profile of the basic scientific writing training participants.

Table 2. Training Participant Profile based on position level

Functional positions level	Generation			Total
	Gen Z	Millennial (Gen Y)	Gen X	
Advance skill level	0.6%	5.0%	1.9%	7.5%
First expert level	1.9%	20.8%	1.3%	23.9%
Young expert level		33.3%	23.3%	56.6%
Intermediate expert level			11.9%	11.9%
Total	2.5%	59.1%	38.4%	100.0%

Most participants were between the ages of 27 to 42 years old, sometimes known as the Millennial

Generation (born between 1981 and 1996), with 33% of them in the Young Expert level position. 28.4% came from Generation X at the Intermediate Expert Level; all participants came from Generation X or in between (aged 43 to 59 years). Age differences will be related to learning styles and motivation (Kamaliah & Rahman, 2021). The coaching strategy is expected to create a learning environment that allows cross-generational collaboration (Thompson, 2016), for example, between those who are strong in identifying the causes of problems and looking at data and those who are strong in analyzing problems related to current conditions. Different levels of functional position provide distinct learning approaches (Martínez-Jiménez & Ruiz-Jiménez, 2020). For the Intermediate Expert Level, the emphasis can be placed on analytical problem-solving skills. Thus, the focus is on developing discussions. Young Expert Level participants focus on describing problems, analyzing data, interpreting data, and drawing conclusions. The first expert level emphasizes technical matters, such as how to search for literature, data processing practices, and adjustments to the systematics and presentation of seminars. It is envisaged that the coaching technique will be a way of discussing and sharing knowledge based on each participant's experiences (Yu et al., 2022).

The assessment of the content of scientific writing is based on content indicators such as an interesting title, correctly formulated research questions, the relationship between the content and the theory referred to, selecting a suitable study method, and conformity with the writing systematics. Meanwhile, assessment indicators in seminar presentations include presentation skills, mastery, and the ability to answer the questions of the evaluator, discussants, and the audience. However, based on Table 2, most respondents came from the Millennial Generation (Gen Y). Therefore, collaboration in writing scientific papers cannot be carried out as a whole. A total of 38.8% of scientific writing was produced between Gen Y, 16% between Gen X, 41.2% between generations, 3% with Gen Y and Z, 29% with Gen Y and X, and 1% Gen Z and X.

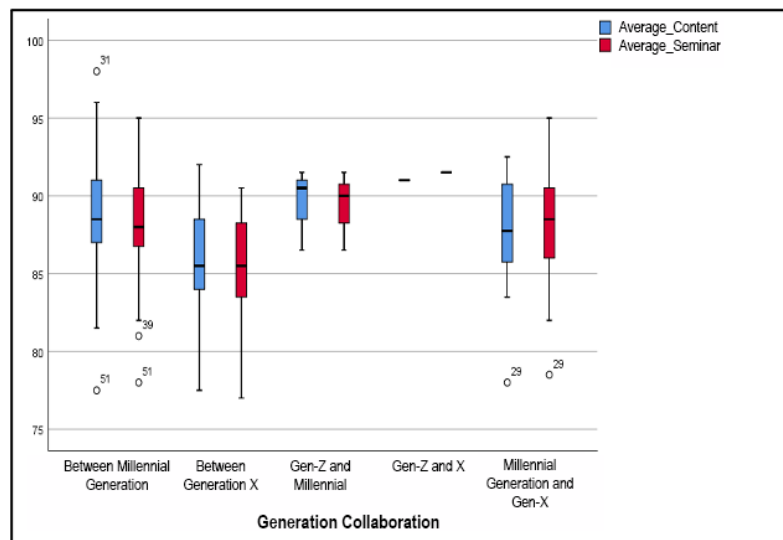


Figure 1. Boxplot Assessment of Scientific Papers Resulting from Generation Collaboration

The findings of the content and scientific writing seminar evaluations are nearly identical. However, collaborating with other generations generates a significant distance. If the collaboration is proper, the outcomes are very positive. However, if cross-generation collaboration is improper, the results will be below average. It is different when cross-generation collaboration is involved. In terms of content and presentation, the seminar provided a more consistent output that yielded satisfactory outcomes. Overall, the rating of scientific papers through collaboration was higher than 80, with only one group falling below 80 and being deemed an anomaly. These findings suggest that cross-generation collaboration in writing scientific publications will allow for the exchange of perspectives and appreciation for both members' contributions to the team. Age disparities also give distinct forces (Christensen et al., 2018). The older generation will bring more insight and understanding, while the younger generation will provide new ideas and understandings, ensuring that with collaboration and a good team, each team member will make an essential contribution, supported by communication, good and trustworthy (Abouelfetouh, 2022). Compared without collaboration, both egos can be equally high, and energy can be equally high or even equally low, allowing them to rely on each other or delegate responsibility for finishing scientific publications to one another. The benefit of well-established cross-generational collaboration is the ability to devise ways to promote communication and collaboration within the team (Stutzer, 2019). Further analysis was tested using ANOVA, as shown in Table 3 below.

Table 3. Statistical evaluation for the content and scientific writing seminar

Annotation	Evaluation aspect	Methods	P-value	Conclusion
Cross-generation Collaboration	Content	ANOVA	0.019	Significant
	Seminar		0.443	Not Significant
Cross-functional position collaboration	Content	<i>Mann-Whitney</i>	0.023	Significant
	Seminar		0.468	Not Significant
Cross-level functional position collaboration	Content	<i>Mann-Whitney</i>	0.389	Not Significant
	Seminar		0.222	Not Significant

The results of collaboration between generations X, Y, and Z were analyzed using the ANOVA method. It was concluded that there were differences in the scientific writing content results for generations X, Y, and Z. So cross-generation testing and cross-functional position collaboration were continued and carried out using the LSD test at Table 4. Further tests with LSD showed that collaboration between Millennials (Gen Y) and Gen X resulted in a significant increase in KTI substance results. Gen Y provides more essential content in scientific writing than Gen X.

Table 4. Advanced testing, cross-generation collaboration

Dependent Variable: Content			Cross-generation collaboration		
Annotation	(I) Generation	(J) Generation	Mean Difference (I-J)	P-value	Conclusion
LSD	Gen Z	Millennial	1.564	0.443	Not Significant
		Gen X	3.274	0.113	Not Significant
	Millennial	Gen Z	-1.564	0.443	Not Significant
		Gen X	1.710*	0.01	Significant
	Gen X	Gen Z	-3.274	0.113	Not Significant
		Millennial	-1.710*	0.01	Significant

One significant factor to consider is that Generation Y understands and is capable of using digital technology (Abdillah et al., 2022). Several curricula given in basic scientific writing training currently include Artificial Intelligence material to help participants conduct scientific searches and explore research ideas. Generation Y also lives in a social environment that has changed dramatically between the eras of being technologically illiterate and technologically literate, so they have experienced both. As a result, they are more adaptable to changes and more critical of phenomena around them (Kosterlitz & Lewis, 2017). Generation Y, currently between the ages of 27 to 42 years, is certainly mature in their career, and growing up in significant social changes, will undoubtedly acquire a broader viewpoint and style of thinking than the previous two generations. Generation Y also bridges more flexible communication between the generations above and the generations below, allowing them to interact and contribute with either generation. Good communication, critical thinking about social phenomena, digital intelligence, and teamwork can all lead to more in-depth essential writing. Functional Positions are a group of positions related to functional services containing duties and functions based on certain skills (Kementerian Pendayagunaan Aparatur Negara Dan Reformasi Birokrasi, 2023). Based on Table 1, there are 11 different functional positions, which will undoubtedly influence the subject of the written work created. The functional positions of Budget Analyst, Legal Analyst, Apparatus Human Resources Analyst, Archivist, Head of administrative sub-division, Legislation Designer, and Trainer are the groups of functional positions that focus on social research and scientific writing. Meanwhile, Food and Drug Analyst, Pharmacy and Food Supervisors, Laboratory Assistants, and Computer Administrator allow scientific writing output to be more focused on quantitative research.

Writing in the social domain will focus more on human behavior, norms, and values related to society, social dynamics, social interactions, focus on policy making, and attempt to produce new facts (Harahap, 2023). Meanwhile, written work with a science background, often called a quantitative approach, explores natural phenomena, tests hypotheses, focuses on research and laboratories, and makes lots of observations to reveal natural phenomena (Sudaryana & Agusiady, 2022). Currently, a lot of research and written work has been developed that combines social and quantitative approaches, often called mixed methods. Using a mixed methods approach will enable cross-disciplinary collaboration and enrich understanding of the phenomenon being researched (Posel, 2017). The differences between the curriculum of Social and Natural Sciences classes can be shown in the topics: (1) Research Methodology, (2) Quantitative Data Analysis, (3) Data Processing and Analysis Practices, and (4) Material for Preparing Research Instruments. Hence, considering the large number of training participants from science classes, the curriculum design also accommodates social class. Therefore, the essence of the training can be achieved, and the selection of a writing coach is directed at coaches who can specifically accommodate the needs of the training participants. The training committee needs to have input on participants' backgrounds related to education and functional positions, which will mainly be related to the

selection of coaches and adjustments to topics in the presentation session. The results of the cross-functional position collaboration were tested using Mann-Whitney's non-metric statistics (Table 3). The responses used were the results of evaluators' input on the output of scientific papers produced, whether they were ready to be submitted, needed minor revisions (related to additional background, adjustments systematic), or a major revision actually needed (the need for more in-depth discussion, the need to strengthen theory, the need to sharpen the problem formulation and sharper data analysis), it is concluded that the output finding provides different revisions in the collaboration of different functional positions. To identify whether the results of collaboration are better than those without collaboration, the descriptive statistics from Mann-Whitney can be seen in Table 5. Collaboration between functional positions provides substantially better results than if there was no collaboration within functional positions, as seen from the mean rank value for collaboration of 56.06, which is better than that for non-collaboration of 38.53.

Table 5. Cross-functional position collaboration

	Cross-functional position collaboration	Mean Rank
Revision of scientific paper output	No collaboration	38.53
	Collaboration	56.06
	Total	

Each functional position has its own characteristics and competence. For example, in the context of social research, Legislation Designers analyze problems more critically, Budget Analysts process data more carefully, and Trainer who are often involved in the academic world conduct analyses and write them more thoroughly. In the field of science, Pharmacy and Food Supervisors make more extensive observations, Computer Administrators are better at data processing and presenting seminars, and Food and Drug Analysts provide more detailed discussions of scientific papers. Thus, if they collaborate, it will further enrich the analysis and sharpen the research arguments. Through collaboration, it is possible to trigger new creativity, points of view, and innovation. Because there is more diversity of thought from different knowledge, the results of scientific papers produced through collaboration between cross-functional positions tend to have many perspectives and points of view and can be accepted in various contexts and to a wider audience. As a result, it is significantly more diverse in terms of opinions and scientific specialties. Collaboration between functional positions can also result in more in-depth solutions based on diverse experiences. In many scientific activities, interdisciplinary collaborative research teams produce results that surpass those produced by individuals independently (Cheruvilil et al., 2014).

Each functional position is allowed to develop their career and receive a promotion in functional position according to the performance assessment of each functional. Of course, this motivates each functional position to perform better, and there is a trade-off in compensation and different workloads at each level. One of the aims of implementing position levels in ASN is to provide clarity in career direction, and each employee will occupy a position and be responsible according to their level of competence. With the existence of functional position levels, the competencies and level of difficulty demanded by the institutions will naturally differ. These differences in functional position levels will determine the competency and level of difficulty that the organization expects from each functional position (Pemerintah Republik Indonesia, 2017). The intermediate expert level will carry out tasks and functions that require high-level professional qualifications, the young expert level with advanced-level professional qualifications, and the first expert level with basic-level qualifications (Kementerian Pendayagunaan Aparatur Negara Dan Reformasi Birokrasi, 2023).

The results of cross-level functional position collaboration, as seen in Table 3, did not show significant results. This suggests that cross-level functional position collaboration and non-collaboration provide equally good results. These studies address significant issues that can occur during cross-level collaboration that prevent it from producing better results, such as (1) difficulty in coordinating since seniority is still considered a higher level; thus, technical work on scientific papers is done by the younger ones, causing unequal contributions in preparing scientific papers, and (2) different perspective in the preparation period of scientific papers. Misperceptions are conceivable even at the collaboration between higher-level functional positions, such as intermediate and main expert levels. Choosing the right team, having commitment, and commensurate contributions strongly influence team coordination (Stephens & Cummings, 2021). The authors believed that the findings of this study will help trainers and training organizers to develop collaborative coaching strategies that involve participants from various positions, levels, and age gaps to produce better quality scientific writing content. In many conditions, juniors are considered to have a looser time than seniors. Then, juniors are considered more detailed when completing technical activities. This kind of culture is still inherent in many agencies, where seniors are more dominant in decision-making and the division of tasks. Junior also had no other choice but to agree to the instructions from the senior. In terms of scientific writing, junior and senior

motivations can be quite different. Seniors who are already more established in their fields and have broad insights are less motivated to complete scientific writing and be involved more deeply. Meanwhile, juniors, because they are in the learning stage, will try hard to gain much experience. So, in scientific writing collaboration, it is necessary to awaken to build a culture of collaboration and encourage equal contribution (Ayenalem et al., 2022). This culture of collaboration can be pursued, one of which is through the addition of training materials with Effective team materials. In terms of overcoming very significant differences in viewpoints, seniors can position or act as mentors or coaches, while juniors can position themselves as coaches. However, of course, the communication must be intense so it does not look like a senior is charging his duties to the junior (Pizzolato & Dierickx, 2022). Contribution awards to juniors are also carried out by giving the first name on the scientific writing manuscript to juniors if juniors contribute a lot to completing scientific writing. Implementing this strategy is hoped to improve the quality of collaboration between levels and help them complete better scientific writing in the future.

CONCLUSION

Planning the Gifted and Talented Student Program in madrasas is a series of strategies to explore the various potentials of gifted and talented students. By integrating various program planning strategies through identification, training, and professional development of teachers, curriculum development, and special talent development, madrasas can help improve and provide input in planning gifted and talented student programs in madrasas. Gifted and talented student program planning contributes significantly to the overall quality of education. The right strategy in identifying gifted students allows madrasas to pay special attention to students with extraordinary abilities so that they can develop optimally. Teacher training and professional development are critical to ensuring that teachers have the skills and knowledge to support gifted students' unique needs. A curriculum developed with flexibility in mind and a focus on student interests helps create a more inclusive and motivating learning environment. Developing special talents through special artistic talent development programs and creative skills, academic competitions, and collaborative activities allows students to explore and hone their specific skills, which in turn can improve their achievements in various fields. Overall, a comprehensive and structured approach to planning gifted student programs can bring significant positive changes in the madrasa education system, making it more responsive and adaptive to the needs of gifted and talented students.

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