

Uncovering the relationship between learning trends and graduation outcome: A retrospective approach

Radhakrishnan Nithya¹, Karthikeyan Sathasivam², Muthiah Ramanathan³.

^{1,2} Department of Pharmaceutics, PSG College of Pharmacy, Coimbatore-641004

³ Department of Pharmacology, PSG College of Pharmacy, Coimbatore-641004

¹nithyar7340@psgpharma.ac.in

²skarthik.kerala@gmail.com

³muthiah.in@gmail.com

Abstract - This study delves deeply into the complex interplay between distinct learner categories and their impact on performance trends and graduation outcomes within the pharmaceutical sciences domain. A cohort of 60 Bachelor of Pharmacy students was analyzed across different learner categories—slow, average, advanced, and non-performers. Methodologically, students' learning capacities were assessed, and tailored support measures were implemented. Graduation outcomes were measured based on industry placements, competitive exam success, and higher studies pursuit. Statistical analysis, including Chi-Square tests, revealed intriguing patterns. Notably, each learner category exhibited varying degrees of achievement on specific graduation outcomes. Our findings challenge the traditional assumptions, and results showcase those average learners significantly contributed across various graduation outcomes, emphasizing their adaptability and resilience. Both slow and advanced learners made comparable contributions, highlighting factors beyond initial learning abilities impacting success. Conversely, non-performers faced challenges hindering their academic and career prospects. Performance trends indicated challenges in pharmaceutical chemistry for slow and average learners, while advanced learners excelled in specific subjects. Average learners dominated in industry placements but displayed weaker performance in competitive exams. The equality in graduation outcomes among advanced and slow learners underscores differing performance metrics. This study's implications emphasize reconsideration of support mechanisms, spotlighting the potential of average learners and the necessity to address challenges faced by non-performers. Future research should explore additional factors influencing graduation outcomes.

Keywords—*learner categories; learning trends; graduation outcomes; pharmaceutical sciences*

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Mrs Radhakrishnan Nithya,
Department of Pharmaceutics,
PSG College of Pharmacy, Coimbatore, Tamilnadu, 641004 India
nithyar7340@psgpharma.ac.in).

I. INTRODUCTION

Educational experts concur that the process of learning goes far beyond mere rote memorization and the ability to recall information. True and enduring learning encompasses a profound comprehension of subject matter, the ability to draw connections between concepts, and the skill to link prior

knowledge with new information. It also involves fostering independent and critical thinking skills and the capacity to apply acquired knowledge in novel and diverse contexts. Throughout their learning journey, students may grapple with a myriad of cognitive, motivational, and emotional hurdles that influence their educational progress. It's important to note that these three domains—cognitive, motivational/affective, and social are interconnected, (Dweck, 2016) and many of the challenges students encounter during their learning journey result from the intricate interplay of these factors.

As an educator, the initial step in supporting student learning involves a comprehensive evaluation of the potential instructional obstacles. This journey commences with a careful and thoughtful assessment of the diverse learning abilities within the student population. This assessment serves as the initial step for effective pedagogy. It is through a keen understanding of the students' learning abilities; teachers can chart a course towards optimized teaching and learning processes. Every learner possesses a distinct and unique approach to acquiring knowledge, shaped by their personal preferences, needs, and learning methods. (Kolb, 2015) These individual variations are commonly referred to as learning styles, and they play a crucial role in comprehending how a student engages with and participates in the learning process. Various techniques exist for identifying students' specific learning styles. (Munje et al., 2021) However, our approach is distinct, as it takes into account not only learners' characteristics, but also their performance in the course. By grouping similar learners based on a variety of characteristics, we aim to place students together with peers who share very similar learning styles. This approach is expected to yield more precise and tailored recommendations for their educational journey. It not only enhances students' understanding and retention of course content but also nurtures their overall academic growth and self-efficacy. (Shemshack & Spector, 2020) This, in turn, can yield dividends in terms of academic achievement and the realization of learning outcomes.

The primary yardstick for assessing learning typically revolves around academic achievements and successful learning outcomes, which often encompass grades, assessments, and coursework performance. However, it's essential to underscore that genuine success lies in pivotal transition from academia to the practical realm which is commonly referred to as "graduation outcomes." They serve as a vital feedback loop, allowing educators to assess whether their teaching strategies are equipping students with the necessary knowledge and skills to excel in real-world scenarios.

Graduation outcomes hold a paramount role not only in acknowledging students' personal and academic accomplishments but also in contributing significantly to institutional recognition and evaluation. (Fung, 2010) These outcomes, which encompass students' progression and the support they receive, serve as crucial criteria in esteemed ranking systems like the National Institutional Ranking Framework (NIRF) and accreditation processes. Recognizing the multifaceted nature of graduation outcomes becomes even more essential, as it directly impacts an institution's standing in the academic landscape, reflecting its commitment to nurturing well-rounded individuals prepared for the challenges of the post-graduation world. Teachers often categorize students based solely on their academic performance, primarily through grades and marks. However, it's imperative to delve deeper and assess whether this categorization accurately mirrors the students' ultimate graduation outcomes. This entails a more comprehensive evaluation that takes into account not just academic achievements but also the students' ability to apply their knowledge in real-world scenarios. (Hattie, 2019) (Akiri et al., 2021) By doing so, we gain a more holistic perspective of a student's educational journey and whether their initial categorization aligns with their actual success in terms of job placements, competitive exams, or further academic pursuits. This analysis helps us ensure that the criteria used for categorizing students truly reflects their long-term achievements and prepares them effectively for future endeavors.

In this context, we propose to embark on a research study that aims to unravel the intricate relationship between students' learning abilities and their graduation outcomes. This endeavor is not only an exploration of academic curiosity but also holds profound implications for educational practice and policy.

II. RESEARCH QUESTION

At its core, our research seeks to answer two fundamental research questions:

1) What is the correlation between learner category and graduate outcomes in higher education?

Our research aims to investigate the intricate relationship between learner categories and graduate outcomes within the realm of higher education. By collecting and meticulously examining data from a broad spectrum of students across different learner categories, we aim to uncover hidden patterns and discern meaningful insights. These insights may include correlations between specific learner categories and certain graduate outcomes, shedding light on how various factors impact students' successful attainment of distinct graduation outcomes.

2) Which particular learning categories are most influential in determining graduation success?

As we explore the complexities of learning categories, we aim to pinpoint the specific learning category that contributes significantly to graduation success. This involves identifying the key drivers of graduation success among these categories.

3) What are the performance trends and graduation outcomes of students in pharmaceutical sciences across different learner categories, including slow learners, average learners, advanced learners and non performers?

Our research investigates how different learner categories (slow, average, advanced, non-performers) relate to performance trends and graduation outcomes in pharmaceutical sciences. These findings can inform better support mechanisms in higher education and the pharmaceutical sector.

III. METHODOLOGY

A. Sample

In our study, we examined a sample of 60 students who were enrolled in the Bachelor of Pharmacy program at a Pharmacy college. At the commencement of each academic year, our institution conducts an orientation Programme where students submit their Bio-Data. This practice offers us valuable insights into the diverse range of backgrounds from which our students originate, encompassing various societal, cultural, and linguistic aspects. This diversity has underscored for us the necessity of tailoring our teaching materials to accommodate their distinct learning aptitudes. We observed that understanding these diverse backgrounds allows us to better serve our students' educational needs.

B. Assessing the Inherent Learning Abilities of Students Across Different Learner Categories

After classes had commenced, we, as subject instructors, assessed students' learning capacities through either formal (written) or informal (oral) entry-level assessments. Following the initial internal assessment examination, we systematically gauged students' learning progress based on the class averages for each subject. Categorization is based on students' performance relative to the class average marks. Those who attain scores below the class average are categorized as 'slow learners'. They encountered challenges in keeping pace with the anticipated learning trajectory. We observed that these individuals often grappled with comprehending, memorizing, and demonstrating course materials. Their motivation levels seemed compromised, and acclimatizing to the teaching-learning process posed difficulties. Importantly, we recognized that underperformance didn't necessarily denote a lack of capability; it could stem from inappropriate teaching methodologies, insufficient motivation, or struggles with an unfamiliar language. Identifying students exhibiting any of the aforementioned traits, coupled with lower grades, prompted us to provide targeted support to assist them in surmounting their difficulties.

Students who exceed the class average are labeled as 'advanced learners.' They can quickly grasp learning activities and consistently achieved high scores. We observed that they demonstrated robust comprehension, memory, critical thinking, creativity, and overarching cognitive abilities. These students demonstrated proficiency in handling increasingly complex course content and assignments, frequently suggesting novel ideas and techniques and taking on leadership positions.

Students achieving marks at the class average are referred to as 'average learners.' We observed that they attained requisite marks and advanced steadily within the established teaching approaches. Typically, they required minimal intervention to progress adequately. Lastly, we encountered "non-performers" among our students. These individuals possessed the potential to perform at the level of average or advanced learners but

grappled with emotional and psychological challenges. We noted that these hindrances impeded their actual performance despite their underlying abilities.

C. Remedial measures for each learning category

In our study, we've observed that students often face varying challenges on their path to graduation success. To address these challenges and provide tailored support, we've implemented a range of remedial measures. For slow learners, we conduct individual academic counseling sessions, organize remedial classes, and administer special tests to understand their needs and enhance their understanding of key subjects. We also offer study aids, promote peer learning groups, and provide personal mentoring to address both academic and emotional needs. Encouraging their participation in student activities helps them discover their hidden talents. In the case of advanced learners, we identify their interests and provide advanced assignments, coaching for competitive exams, and recognition through awards and guest speaker engagements. They also play a crucial role in peer tutoring and engage in research opportunities and leadership roles. Average learners are encouraged to participate in student activities, quizzes, and presentations. Furthermore, we provide an expanded array of advanced assignments and tasks to challenge and advance their capabilities. Non-performers receive counseling and mentorship, with referrals to the Student Wellness Centre if needed. We motivate them to discover their innate talents and explore opportunities for personal growth. These remedial measures are essential in providing comprehensive support to students across various categories, helping them overcome challenges, and empowering them to achieve successful graduation outcomes.

D. Graduation outcome measurement

In our study, we measured the graduation outcomes by assessing the achievements among the entire group of 60 students. We evaluated these accomplishments using several key indicators. Firstly, we considered the count of students who successfully secured placements within the pharmaceutical industry. This category included roles spanning pharmaceutical marketing, both hospital and community-based pharmacy positions, as well as placements within pharmaceutical companies. Secondly, we factored in students who successfully cleared competitive examinations, thereby securing admissions into esteemed institutions for their post-graduate studies in India and abroad. This accomplishment highlighted their academic excellence and the recognition of their potential on a broader stage. Lastly, we took into account the academic advancement of students who opted for higher studies. This category encompassed students who pursued advanced degrees beyond their B.Pharm program, showcasing their dedication to further academic enrichment.

Among our entire cohort of 60 students, we observed that 36 students achieved commendable graduation outcomes, signifying their successful entry into professional or academic fields aligned with their goals. We defined successful graduation as those who attained it promptly after completing their studies, while the remaining students might have achieved it with a slight delay.

IV. RESULTS

A. Patterns of Student Learning Categories in Various Career Paths

In our investigation, we focused on assessing the learning aptitudes of students over a four-year academic journey and their connection to diverse graduation accomplishments. Among the 60 students in our study, we observed varying outcomes. Specifically, 19 students opted for advanced studies, 13 secured positions within the pharmaceutical sector, and 4 students achieved remarkable success in national-level competitive exams, thereby gaining access to prestigious institutions.

One of the most intriguing revelations of our analysis pertains to the connection between learner category and placements within the pharmaceutical sector. We noted a significant representation of average learners, with 7 of them contributing to this outcome. This suggests that, within the context of the pharmaceutical sector, academic success is not solely determined by advanced learning abilities. The significant contributions made by both slow learners and advanced learners, each with three students in our study, challenge the conventional assumption that specific learning abilities are mandatory prerequisites for securing positions in the industry. The achievement parity between slow learners and advanced learners highlights that success is not solely reliant on academic performance; it emphasizes the importance of skills that enable slow learners to unlock their full potential. Importantly, we observed that non-performers did not participate in this outcome, indicating that a minimum level of academic performance is necessary for entering this sector.

Furthermore, the success of students in national-level competitive exams demonstrated a similar pattern. While 2 students who excelled were from the average learner group, we also noted contributions from 1 slow learner and 1 advanced learner. Interestingly, there were no non-performers among the achievers. This outcome highlighted that competitive exams may not necessarily favor students with advanced learning abilities exclusively. Instead, it underscored the significance of factors beyond learning abilities, such as preparation, motivation, and exam-taking skills.

In the realm of higher education, an analysis of our students' distribution among the learner category groups reveals intriguing patterns. When it comes to those who embarked on higher studies, we observed a diverse mix. Remarkably, five slow learners, five advanced learners, and nine average learners all made significant contributions to this group. It's noteworthy that in this category, the number of slow learners equaled that of advanced learners, challenging the notion that advanced education is primarily reserved for high achievers. What stands out is that the majority of students pursuing higher studies fell into the 'average learner' category, comprising nine students. This observation is pivotal as it challenges the long-held belief that academic struggles automatically preclude access to advanced education. Our findings indicate that, despite varying initial learning capacities, students from different learner categories successfully pursued higher studies.

One intriguing facet of our analysis is the notable absence of 'non-performers' among the cohort of students who opted for higher studies. This suggests that a more comprehensive and

empathetic approach, delving deeper into understanding the emotional barriers that students may face, could be required to support them.

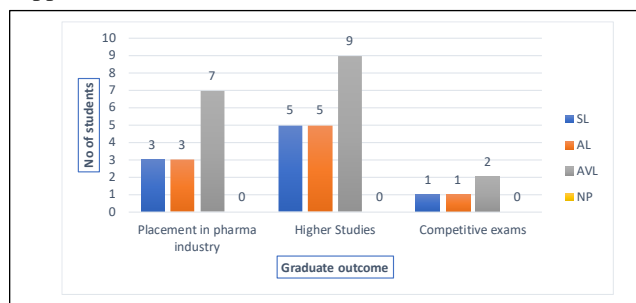


Fig 1: No of learner categories across graduation outcome

B. Learner Category Contributions to Graduation Outcomes

In our study, we conducted a thorough analysis to identify which learner category exerted the most significant influence on graduation outcomes. Among slow learners, we observed a substantial impact, with 33% securing placements in the pharmaceutical industry, 11% succeeding in competitive exams, and 56% pursuing advanced studies. Conversely, advanced learners exhibited a similar pattern to slow learners, with proportions of 33%, 56%, and 11% in the same respective categories. Interestingly, average learners played a substantial role across the spectrum, contributing 39%, 50%, and 11% to pharmaceutical industry placements, competitive exam success, and advanced studies. In contrast, non-performers had no influence on any of the three graduation outcomes.

Our observations highlighted the dominance of average learners in various categories of graduation outcomes, underscoring their adaptability and resilience. The remedial measures adopted for average learners created a conducive environment, empowering them to excel across different graduation categories. We noticed a consistent pattern where both advanced and slow learners made equal contributions, reinforcing the notion that success isn't inherently linked to initial learning abilities.

The significant contribution of slow learners to pharmaceutical industry placements suggests the efficacy of tailored support mechanisms in facilitating their successful transition into the workforce. This is evidenced by their achievements in placements and pursuit of higher studies, showcasing effective preparation for professional roles and enhanced competence in the field. Ultimately, inherent learning abilities, coupled with a diverse skill set, position advanced learners favorably for both industry placements and advanced academic endeavors. However, the lack of contribution by non-performers indicates the necessity for a reassessment and redesign of existing remedial measures for them.

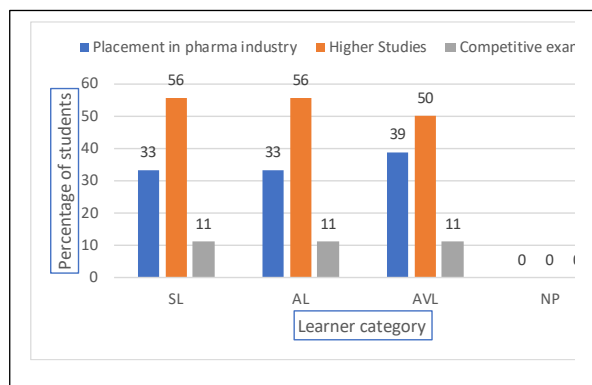


Fig 2: Percentage Contribution of learner categories to each graduation outcomes

C. Performance Trends and Graduation Outcomes of Slow Learners in Pharmaceutical Sciences

In our research exploring learner categories, specifically emphasizing slow learners within the expansive scope of pharmaceutical sciences encompassing disciplines such as pharmaceutical chemistry and analysis, pharmaceuticals, pharmacology and pharmacy practice and pharmacognosy, we aim to establish a correlation between the academic performance of slow learners and their graduation outcomes.

It indicates that slow learners encountered the most substantial challenges in pharmaceutical chemistry, highlighting the formidable hurdles posed by this subject. Conversely, they exhibited comparatively enhanced performance in other subjects notably pharmacognosy, demonstrating a stronger grasp of these subjects in contrast to pharmaceutical chemistry.

Our analysis of graduation outcomes yielded valuable insights; slow learners achieved the lowest success rate in competitive examinations, indicating potential limitations in applying pharmaceutical science knowledge across diverse contexts. In contrast they demonstrated their highest performance in pursuing higher studies, suggesting their inclination towards upgradation of knowledge. Despite their performance, slow learners securing significant number of placements within the pharmaceutical industry, implying their industry-specific practical skills.

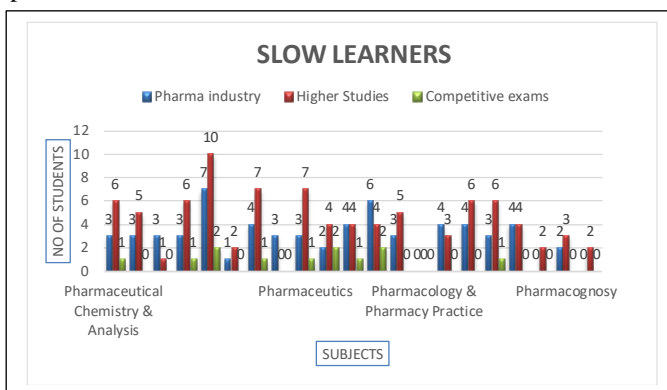


Fig 3: Slow Learners in Pharmaceutical Sciences versus Graduation Outcomes

D. Academic Performance and Graduation Achievements of Average Learners in Pharmaceutical Sciences

Continuing our investigation into the interplay between learner categories and graduate outcomes in higher education, we now shift our focus to the performance of average learners. Across subjects, distinctive patterns emerge: Pharmaceutical chemistry and analysis draw a larger cohort of average learners, signifying the curriculum's complexity. In contrast, pharmacognosy stands out with the fewest average learners, aligning with the trend observed among graduates identified as slow learners. This correlation echoes our earlier findings.

Examining graduation outcomes for average learners reveals intriguing observations. Notably, they boast the highest placement rates within the pharmaceutical industry and perform commendably in competitive exams, showcasing the practicality of their pharmaceutical knowledge across diverse contexts. Their versatility and adaptability shine, although they demonstrate comparatively lower performance in pursuing advanced studies. This highlights the necessity for increased dedication and perseverance in graduate-level programs, especially considering pharmaceutical chemistry's attraction for the highest number of average learners.

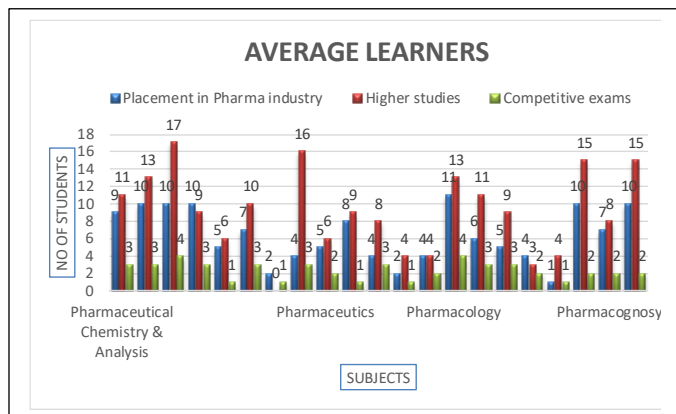


Fig 4: Average Learners in Pharmaceutical Sciences versus Graduation Outcomes

E. Impact of advanced learners on Academic Performance and Graduation Achievements in Pharmaceutical Sciences

In our examination of advanced learners across pharmaceutical sciences subjects, distinct patterns emerge, indicating their influence on academic performance and post-graduation achievements. Pharmaceutics, pharmacology, and pharmacy practice notably attract a higher concentration of advanced learners, suggesting a strong affinity or comfort with these subjects. This inclination potentially leads to enhanced academic outcomes for students specializing in these areas.

Conversely, pharmaceutical chemistry exhibits a lower number of advanced learners, hinting at greater challenges or complexities within this subject compared to others. This disparity might impact academic achievements, potentially affecting graduation outcomes in this field. Meanwhile, pharmacognosy stands with a moderate number of advanced learners, indicating a middling level of comfort among this learner category.

Understanding the distribution of advanced learners across subjects offers insights into the difficulty levels and nuances within the pharmaceutical sciences curriculum. This correlation between learner distribution and academic achievements underscores the need for educators and curriculum designers to explore these disparities. Insights gained can inform strategies to optimize learning experiences, ensuring better support for student success.

Post-graduation outcomes for advanced learners showcase distinct trends. A majority pursue higher studies, reflecting a commitment to continuous learning and specialization within pharmaceutical sciences. This inclination towards advanced degrees signifies an interest in research, innovation, or specialized fields within the discipline.

The next prevalent outcome is placement within the pharmaceutical industry, attributed to advanced learners' strong academic foundations. Their comprehensive understanding likely makes them appealing candidates for industry roles, aligning with industry demands.

However, there's a lower representation of advanced learners in competitive exams. This trend prompts examination of potential factors influencing their preferences or perceptions, possibly related to prioritizing academic or industry-based achievements over competitive examinations.

These graduation outcomes highlight the diverse trajectories pursued by advanced learners. While excelling in academia and industry, their lower representation in competitive exams warrants exploration. Understanding these trends is crucial in providing tailored support for advanced learners, facilitating their transition into varied career pathways. Educators and career counselors can utilize these insights to optimize opportunities for advanced learners within the pharmaceutical sciences landscape.

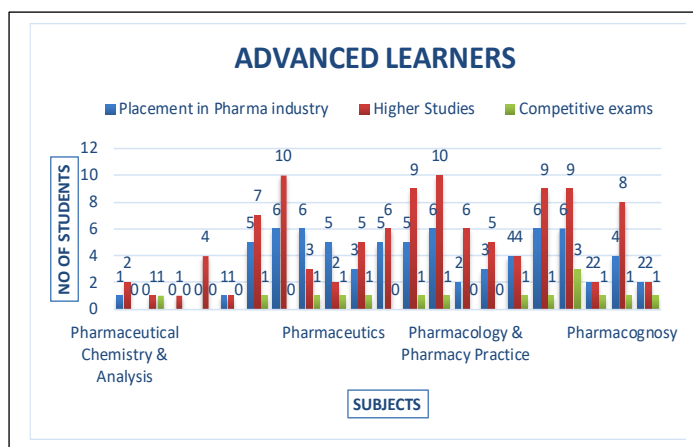


Fig 5: Advanced Learners in Pharmaceutical Sciences versus Graduation Outcomes

F. Influence of Non performers on Academic Performance and Graduation Attainments in Pharmaceutical Sciences

Our investigation in pharmaceutical sciences revealed a distinct pattern among non-performers, a smaller subset compared to slow, average, and advanced learners. Notably, these individuals consistently faced challenges in subjects like pharmacology and pharmacy practice, with a pronounced concentration of strugglers in pharmacology while subjects such as pharmaceutical chemistry, pharmaceutics, and pharmacognosy had fewer non-performers. Interestingly, despite its perceived difficulty, pharmaceutical chemistry surprisingly had the fewest non-performers among slow and average learners.

However, despite their presence within the academic sphere, non-performers did not significantly contribute to any graduation outcomes in our study. Their struggles in meeting academic standards, particularly in crucial subjects like pharmacology and pharmacy practice, hindered their progression and prevented substantial contributions to graduation statistics in pharmaceutical sciences.

This lack of contribution underscores the significant hurdles non-performers faced in their academic journey, impeding their ability to grasp essential concepts and apply knowledge effectively. Consequently, their challenges impacted their academic progression, leading to a limited impact on overall graduation outcomes in the field of pharmaceutical sciences.

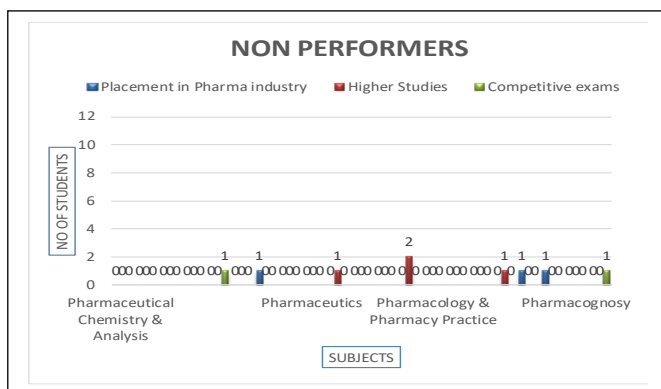


Fig 4: Non-performers in Pharmaceutical Sciences versus Graduation Outcomes

G. Statistical methods - Chi square test

In our study, we focused on evaluating the post-graduation achievements of a cohort of 60 students who completed a Bachelor of Pharmacy program. Our specific analysis honed in on the 36 students who successfully graduated from the initial group of 60. To explore the potential relationship between students' learning abilities and their graduation outcomes, we conducted a Chi-Square analysis.

Our findings revealed that there isn't a substantial correlation between a student's learner category and their graduation outcome. To be precise, we computed the Chi-Square statistic at 0.1296, and the accompanying p-value was 0.99799. This outcome didn't meet the conventional significance threshold of $p < 0.05$, signifying a lack of statistical significance.

In light of this analysis, along with the dataset and statistical method we employed, we couldn't find sufficient evidence to suggest a meaningful link between students' learning abilities and their eventual graduation achievements in our studied population. We acknowledge that there may be other unexplored variables and factors that influence graduation outcomes. Thus, further research is warranted to delve into these additional factors that might contribute to successful graduation outcomes.

TABLE I: CHI-SQUARE TEST OF INDEPENDENCE FOR LEARNER CATEGORY AND GRADUATION OUTCOME

Learner category	Placement in pharma industry	Higher studies	Competitive exams	Row totals
SL	3 (3.25) [0.02]	5 (4.75) [0.01]	1 (1.00) [0.00]	9
AL	3 (3.25) [0.02]	5 (4.75) [0.01]	1 (1.00) [0.00]	9
AVL	7 (6.50) 0.04]	9 (9.50) [0.03]	2 (2.00) [0.00]	18
Column Totals	13	19	4	36 (Grand Total)

V. DISCUSSION

In this study, we set out to investigate the complex relationship between learner categories—specifically slow learners, average learners, advanced learners and non-performers and their subsequent performance trends and graduation outcomes in the field of pharmaceutical sciences. Our research questions delved into the correlation between learner categories and graduate outcomes in higher education, the influence of particular learner categories on graduation success, and the performance trends and graduation outcomes of pharmaceutical sciences students across different learner categories.

A. Correlation between Learner Category and Graduate Outcomes in Higher Education

Our first research question aimed to uncover the correlation between learner categories and graduate outcomes in higher education. Through a meticulous examination of a diverse group of students representing these categories, our findings suggest that graduation outcomes are not solely determined by advanced learning abilities. Contrary to conventional assumptions, we observed that average learners and even some slow learners made notable contributions to specific graduation accomplishments.

The pharmaceutical sector, for instance, showcased a significant representation of average learners, challenging the assumption that advanced learners are the sole contenders for industry placements. This revelation highlights the multifaceted nature of success in this sector, where factors beyond just advanced learning abilities come into play.

Similarly, in the context of national-level competitive exams, our data demonstrated that students from various learner categories excelled, indicating that factors like preparation, motivation, and exam-taking skills play pivotal roles. This finding emphasizes that success in competitive examinations is not restricted to those with advanced learning abilities alone.

B. Contribution of Slow Learners and Advanced Learners

One of the notable trends observed in our study is the almost equal contribution of slow learners and advanced learners to various graduation outcomes. Both these learner categories played significant roles in pharmaceutical industry placements, success in competitive exams, and the pursuit of advanced studies. These findings challenge conventional assumptions that specific learning abilities are prerequisites for industry placements or success in competitive examinations. It suggests that factors beyond learning pace and aptitude, such as motivation, preparation, and exam-taking skills, also play pivotal roles.

C. Influence of Particular Learner Categories on Graduation Success

Our second research question sought to identify which particular learner categories are most influential in determining graduation success. Our in-depth analysis revealed that different learner categories exert varying degrees of influence on specific graduation outcomes. Slow learners, for instance, made substantial contributions to placements within the pharmaceutical industry, signifying the importance of tailored support mechanisms (Isusi-Fagoaga et al., 2023) to facilitate their successful transition into the workforce. On the other hand, advanced learners displayed dominance in pursuing higher studies, underlining their potential for academic advancement. Average learners exhibited remarkable adaptability and resilience across a spectrum of graduation outcomes, playing a significant role in pharmaceutical industry placements, competitive exam success, and advanced studies. This adaptability suggests that average learners possess a versatile skill set that aligns with a diverse range of career pathways.

D. Challenges faced by non-performers

Our findings indicate that non-performers did not make any significant contribution to any of the graduation outcomes we examined, including pharmaceutical industry placements, success in competitive exams, and the pursuit of advanced studies. This observation underscores the profound challenges faced by non-performers in the field of pharmaceutical sciences and suggests that their emotional and psychological struggles had a tangible impact on their academic and career prospects. Their underperformance in our study emphasizes the importance of providing comprehensive support mechanisms within educational institutions, which extend beyond academic assistance.

E. Performance Trends and Graduation Outcomes of Students in Pharmaceutical Sciences Across Different Learner Categories

Our third research question delved into the performance trends and graduation outcomes of students in pharmaceutical sciences across different learner categories. This aspect of our study illuminated various patterns and insights. Among various learner categories in pharmaceutical sciences, slow and average learners encountered their most significant challenges within pharmaceutical chemistry, contrasting with comparatively improved performance in other pharmaceutical science subjects. Notably, a reduced presence of advanced learners was observed in pharmaceutical chemistry and analysis, while this subject surprisingly had a low number of non-performers. Among these learner categories, average learners achieved the highest number of graduation outcomes, excelling in securing placements within the pharmaceutical industry. However, their performance in standardized competitive exams was comparatively weaker. Interestingly, both advanced and slow learners demonstrated a similar level of success in graduating, indicating comparable achievements in completing higher studies. This equality in graduation outcomes hints at differing performance metrics outside academics, such as placement rates and competitive exam performances among these learner groups. (Matthews et al., 2017)

V. CONCLUSION

The outcomes of our study have significant implications for higher education and the pharmaceutical sciences field. The study challenges the conventional assumption that advanced learners drive maximum institutional growth and achieve the highest graduation outcomes. Surprisingly, among various learner categories, it is the average learners who significantly contribute to the highest number of graduation outcomes. This emphasizes the need to reconsider support mechanisms, suggesting that improved support for average learners could substantially increase graduation rates and facilitate successful career paths. By focusing on aiding this category of students, institutions can not only boost their graduation numbers but also foster greater institutional growth through their enhanced contributions. This study also impart the need of implementing tailored support mechanism by educational institutions and policymakers to facilitate the success of learners across different categories. Furthermore, this study demands the need of future research to explore additional factors beyond learning abilities that may influence graduation outcomes. A more comprehensive understanding of these factors can inform the development of effective support systems to enhance the overall success of students in pharmaceutical sciences and higher education as a whole.

In conclusion, our study provides valuable insights into the intricate relationship between learner categories, academic performance, and graduation outcomes. These findings contribute to a more holistic understanding of student achievement and serve as a foundation for enhancing educational strategies and support mechanisms.

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