Inclusive Practices: A Questionnaire Development for Faculty to Shape the Future of Transgender Inclusion in Physical Education

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ARTICLE INFO	ABSTRACT
	Purpose: This study aims to investigate inclusive practices within Indian Physical Education (PE), specifically focusing on transgender inclusion. The study introduces, validates and develops the Trans PE Future Approaches Questionnaire (TPEFAQ) to assess faculty perceptions and shape future approaches to transgender inclusion in Indian PE. **Materials and Methods:** The study conducted a comprehensive analysis of the current state of transgender inclusion in PE and developed and validated the TPEFAQ, comprising four factors: Equality, Educational Rights, PE Teacher Training, and Societal Acceptance. A cross-sectional survey was conducted among n=70 participants from various universities across India. Confirmatory Factor Analysis (CFA) and Exploratory Factor Analysis (EFA) were utilized to establish the reliability and validity of the questionnaire. Statistical analyses, including Cronbach's alpha coefficient, CFA, and variance analysis, were conducted using AMOS and SPSS version to examine model fit and internal consistency. **Results:** The Cronbach's alpha coefficient value for the entire questionnaire was 0.935, indicating strong reliability. CFA demonstrated good model fit indices (CFI = 0.964, GFI = 0.855, RMSEA = 0.084, RMR = 0.046), indicating the validity of the TPEFAQ in assessing transgender inclusion in Indian PE. **Conclusions:** The TPEFAQ serves as a crucial tool for assessing faculty perceptions and shaping future approaches to transgender inclusion in Physical Education. The TPEFAQ contributes to a more inclusive and supportive educational experience, determining future approaches to transgender inclusion in Physical Education. **Keywords:** Transgender inclusion, Physical Education, Trans PE Future Approaches Questionnaire, Inclusive practices, Validation.

Introduction

In recent years, the discourse on education has evolved to emphasize the pivotal role of inclusive practices within educational environments. The educational environment, alongside curriculum, resources, outcomes, and leadership, stands as a cornerstone influencing the overall effectiveness of educational institutions (Ferguson, 2008;Haug, 2017). It is within this context that the concept of inclusive practices becomes increasingly significant, particularly in the domain of Physical Education (PE) (Ha, 2012). This study endeavors to delve into the realm of inclusive practices within Indian Physical Education, with a specific focus on shaping the future of transgender inclusion. "Transgender is an umbrella term for persons whose gender identity, gender expression or behaviour does not conform to that typically associated with the sex to which they were assigned at birth". Transgender individuals have faced prolonged periods of neglect and trauma throughout history across the globe. Their existence can be traced back to 19th century B.C., and in India, there is a recorded history of over 4000 years involving transgender individuals. The Mughal monarchs' reign from 1526 to

1857 marked a golden era for eunuchs, who served as key advisors (Michelraj 2015). However, post-1870 during the British colonial era, laws such as the Criminal Tribes Act and the Dramatic Performances Act were enacted. These legal measures significantly restricted the activities of the transgender community members and, in the process, stripped them of their basic rights. This historical context underscores the challenges and setbacks faced by transgender individuals, with significant implications for understanding their experiences and struggles (Hinchy, 2019). Transgender were counted for the first time in India 2011 census after the government decided on their inclusion in the population count as a separate category. Until 2011 population census had only two categories of gender male and female and there was no choice of third gender (Das, 2019). According to the 2011 census data in India, 487,803 people, constituting 0.04 percent of the total population, were classified as belonging to the third gender (Kataria, 2019).

Education is essential for everyone as it serves as a fundamental catalyst for personal growth, societal progress, and the advancement of nations. Its impact extends far beyond the individual, shaping the future of communities, nations, and the world at large(Indrayani, 2014). Access to quality education is crucial for fostering a just, inclusive, and prosperous society. According to transgender person act 2019 'Inclusive education' means a system of education wherein transgender students learn together with other students without fear of discrimination, neglect, harassment or intimidation and the system of teaching and learning is suitably adapted to meet the learning needs of such students (Ministry of Law and Justice, 2019).As per census data, this community has a low literacy rate, with only 46% of transgender people being literate, compared to 74% of the general population. The state with the biggest number of transgender people, Uttar Pradesh, recorded a literacy rate of 55.8%.Hence, within Uttar Pradesh; a residence for a total of 137,465 transgender individuals was identified. With 44.2% of this population being illiterate, it implies that over 60,000 individuals lacked basic literacy, rendering them vulnerable to exploitation (Census 2011). A comprehensive study of 900 transgender individuals in Delhi and Uttar Pradesh, sponsored by the National Human Rights Commission (NHRC) and conducted by an NGO in 2017, highlighted that 29.11% in Delhi and 33.11% in Uttar Pradesh had never received any formal education. Furthermore, the study disclosed that merely 5.77% of the surveyed population held a graduate degree, while approximately 47% had not completed their 10th standard education.The lower literacy rate among transgender individuals can be attributed to various interconnected factors, including social stigma, discrimination, lack of inclusive policies, bullying, harassment, and institutional challenges (Kerala development society, 2017).Considering the available statistics, it is evident that by promoting social inclusion and providing transgender people with equal access to education, skill development, and employment, this sector of the population may succeed just like any other member of society.

The limited research was available in this area about transgender in setting of physical education. In Indian perspective no study was done before regarding inclusion TG in PE.PE can be a place where students experience homophobia and discrimination due to their sexual orientation. Transgender students, who identify differently from their assigned gender at birth, face additional challenges (Drury, 2022). They may feel uncomfortable in gendered spaces, such as locker rooms, and can encounter discrimination, lack of support, or even violence. Worldwide, harassment significantly affects the participation of transgender individuals in organized physical activities and sports. In Spain, nearly 19% of trans people face harassment in these contexts. In Australia, 25% of surveyed trans individuals experience verbal harassment and in the UK, 27.8% of trans students worry about verbal or physical abuse in similar settings (Devís 2017, Pérez 2019).These difficulties are often rooted in societal biases against gender identity and expression. Insufficient legal protection for transgender rights further compounds these challenges, limiting their access to education (Bhattacharya et al., 2022; Devís-Devís et al., 2018; Drury, 2023).Therefore, Inclusion in education is vital for the well-being of transgender individuals. It's crucial that educational institutions respect the gender identity of all students. An inclusive and supportive physical education program is best for transgender students (Bhattacharya et al., 2022). Physical education (PE) has been criticized for reinforcing traditional gender norms and fostering homophobia. Transgender students often face challenges in PE, feeling uncomfortable in gendered spaces and struggling to fit in due to rigid gender expectations. To address these issues, the text suggests teachers play a key role in creating an inclusive and safe environment for these students (Drury, 2023). Transgender eligibility, selection, evaluation, and scope in regarding physical education is more concern nowadays. There should be proper spared knowledge about their rights to foster trans recognition and gender diversity education (Miguel 2023).

The role of educational institutions is vital in creating a positive environment for learning and acceptance. However, there hasn't been enough attention given to helping transgender inclusion and improve their surroundings. Challenges like limited access to physical education, ensuring the right to education, teacher training, and promoting social acceptance have made it difficult for teachers to fully engage in enhancing the educational experience. These practical issues need more focus to make sure our education environments are inclusive and supportive (Bhattacharya et al., 2022; Devís-Devís et al., 2018; Drury, 2023).In response to this gap, our study introduces the Trans PE Future Approaches Questionnaire (TPEFAQ), a dynamic instrument designed to assess and shape inclusive practices within Indian Physical Education. Centered around four pivotal factors – Equality, Educational Rights, PE Teacher Training, and Societal Acceptance – the TPEFAQ aims to provide educators with a tool that not only identifies existing challenges but also guides the formulation of strategies to pave the way for a more inclusive and supportive future.Consequently this article describes the development and validation of a new instrument, the Trans PE Future Approaches Questionnaire (TPEFAQ), which measures teachers' perceptions of future approaches dimensions regarding transgender inclusion in PE. For teachers, the TPEFAQ has some major advantages: holistic understanding of transgender inclusion, modified strategies for improvement, informing inclusive policies, and professional development opportunities. As we embark on this exploration, we recognize the need for a concerted effort to understand, acknowledge, and address the unique

challenges faced by transgender individuals within the educational landscape (Drury, 2023). By focusing on the development and validation of the TPEFAQ, our study seeks to contribute to the ongoing dialogue on inclusive practices, paving the way for positive change in Indian Physical Education and fostering an environment where every student, regardless of their gender identity, can thrive. Through this questionnaire, we aim to empower faculty members to actively shape the future of transgender inclusion in Indian Physical Education, laying the foundation for a more equitable and supportive educational experience for all.

Method

Participants
The initial version of the "**Trans PE Future Approaches Questionnaire" (TPEFAQ)**, was tested among a randomly selected sample of seventy university professors, associate professors, and assistant professors in the field of physical education from different universities in India. Seventy subjects completed the questionnaire, with 54 males and 16 females.

Table 1: Demographic Characteristics (n=70)

Characteristics	n	(%)
Male	54	**77.14%**
Female	16	**22.85%**
Participants (Total)	70	**100%**

The table no 1, which detailed the demographic characteristics of a sample of 70 participants, indicated that out of the total, n=54 participants accounted for 77.14% and were male, while n=16 participants represented 22.85% and were female. This data presented a precise description of the gender distribution within the sample at the specific point in time when the observations were made.

Table 2: Designation Characteristics (n=70)

Professors	3	**4.2%**
Associate Professors	6	**8.5%**
Assistant Professors	61	**87.14%**
Participants (Total)	70	**100%**

The table no 2, which focused on the designation characteristics of the same 70 participants, it disclosed that, n=3 participants accounted for 4.2% and wereProfessor, while n=6 participants represented 8.5% and were Associate Professors, and a significant majority, n=61 participants accounted for 87.14%, were Assistant Professors. This data breakdown presented on the diverse professional roles held within the participant pool, present valuable insights into the composition of the study's sample during the period of analysis.

Distribution
Data were collected through Google Forms and hard copies, distributed in various universities, and conducted individually in person by the researcher from August to November 2023. Each factor covered broad topics related to equality, educational rights, physical education teacher training and societal acceptance. All participants in this research signed a written informed consent, and no vulnerable populations were involved.

Procedure of the Questionnaire
The questionnaire was developed by a researcher. An initial pool of 110 items was prepared by the researcher for all four sections of the questionnaire. Section A- was challenges and criteria, Section B- Provision and support, Section C- Future Approaches, and Section D- Environment. This study was focused on section C- Future Approaches of transgender inclusion in the physical education. The questionnaire underwent a review by Physical Education professionals (n=20) from different universities in India; this process is referred to as face validity. Additionally, reviewers from various Indian universities provided feedbacks on the factors and items. Systematic documentation of expert feedback is essential. The researcher meticulously records all comments, recommendations, and insights provided by the expert panel. After this process, eighty items were selected from the initial item pool for the construction of the questionnaire and twenty eight items were deleted. Twenty items were chosen for each section, and five items were selected for each factor. Once the questionnaire has undergone thorough expert feedback and revisions, the researcher enters the pilot testing phase.

Subsequently, a pilot study was conducted with physical education faculties (n=70), and the pilot participants provided feedback on the questionnaire. After considering the feedback, the researcher finalized the setup of the questionnaire. The self-made questionnaire was divided into four sections and Section C- "Future Approaches," was selected for this study. The research plan received approval from the Board for Research Ethics at the Department of Physical Education, Banaras Hindu University, India. The questionnaire included five-point Likert scales, and their usage in this study will be described below. The questionnaire commenced with an informed consent statement, ensuring participants that their involvement was voluntary and confidential, and they could exit the questionnaire at any time. Respondents were

encouraged to take their time in responding carefully, and given the questionnaire's length, they were provided with the option to save responses and complete it later. Participants were also briefed on the study's objectives and potential of the TPEFAQ.

Data Analysis:

The reliability and validity of the questionnaire were tested using SPSS and AMOS. The study employed Confirmatory Factor Analysis (CFA) and Exploratory Factor Analysis (EFA). The use of two statistical programs, SPSS and AMOS, ensured a thorough examination of the data. This dual approach helped ensure the reliability and validity of the questionnaire, meeting the high standards expected in academic research. After the statistical analysed the TPEFAQ comprised 12 items (see Table 3). For each item, we used a five-point Likert-type scale. Participants marked the box (from "strongly disagree" to "strongly agree") that most closely matched their reply to each statement. Responses were labelled 1–5 from "strongly disagree" to "strongly agree." Experts from Physical Education were consulted to determine the face validity and content validity of the items.

RESULTS

Development of TPEFAQ

In this context, the study aimed to develop the TPEFAQ specifically for physical education professionals in higher education. The questionnaire designed to gather opinions and concerns of physical educationists regarding future approaches for the inclusion of transgender individuals in the field. In theExploratory factor analysis (EFA) the Communalities represents the proportion of variance in each observed variable that is accounted for by the factors extracted in the EFA. Higher communalities indicate a better fit of the observed variables to the extracted factors. These values usually range from 0 to 1.The percentage of variance explained for each factor provides an understanding of how much of the total variance in the data is explained by each factor.

Table 3: Communalities and % of Variance

Factor	Statement	Communalities(Extraction)	Delete	% ofVariance
Equality	ST_2	0.848	ST_1, ST_5	81.925
	ST_3	0.878		
	ST_4	0.731		
Educational Rights	ST_2	0.881	ST_1, ST_5	82.118
	ST_3	0.770		
	ST_4	0.815		
PE Teacher Training	ST_1	0.833	ST_2, ST_3	79.918
	ST_4	0.830		
	ST_5	0.734		
Social Acceptance	ST_2	0.830	ST_1, ST_4	78.140
	ST_3	0.804		
	ST_5	0.710		

In the presented table 3, the factor analysis aims to identify underlying relationships between factors and statements, focusing on communalities and variance percentages. The criteria for deletion are based on communalities are loading below 0.70 (Knekta 2019) in the extraction process of EFA. This selection process allows for the enhancement of the factors by retaining statements that contribute more significantly to the overall variance, enhancing the effectiveness of the factor analysis in capturing the essential dimensions of the studied constructs.

Rigorous testing of the TPEFAQ's validity and reliability showed a high Cronbach's α coefficient of reliability index at .935, signifying its high reliability. Alpha scores of 0.7 are generally considered adequate, 0.8 and above are considered fairly good, and beyond 0.9 are considered to have outstanding internal consistency (Cronbach, 1951).

Table 4: Cronbach's Alpha of factors

Name of the factor	Items	Cronbach's Alpha
Equality	2,3,4	.889
Educational Rights	2,3,4	.891
PE teacher training	1,4,5	.873
Social acceptance	2,3,5	.858
Altogether 4 Factors	12 Items	.935

The table 4, presents the results of a factor analysis involving four distinct factors—Equality, Educational Rights, PE Teacher Training, and Social Acceptance—with corresponding items and their associated Cronbach's Alpha reliability coefficients. Each factor comprises specific items, demonstrating a consistent pattern of item grouping. The Cronbach's Alpha values for each factor exceed the conventional threshold of 0.7, indicating strong internal consistency within each

factor. Additionally, the overall scale exhibits a high level of reliability, as reflected by the combined Cronbach's Alpha of .935. This indicates that the study factor is appropriate and internally consistent.

Confirmatory Factor Analysis (CFA) supported the four-factor model, with most validity indexes surpassing predefined cutoff values. These results affirm the validity and reliability of the TPEFAQ, making it a valuable instrument for understanding and addressing future approaches for transgender inclusion in the realm of physical education in India. A path diagram in the context of (CFA) is a visual representation of the hypothesized relationships among observed and latent variables. CFA is a statistical technique used to test whether the observed variables (indicators) adequately reflect the underlying latent constructs or factors. Here's a path diagram in CFA of TPEFAQ.
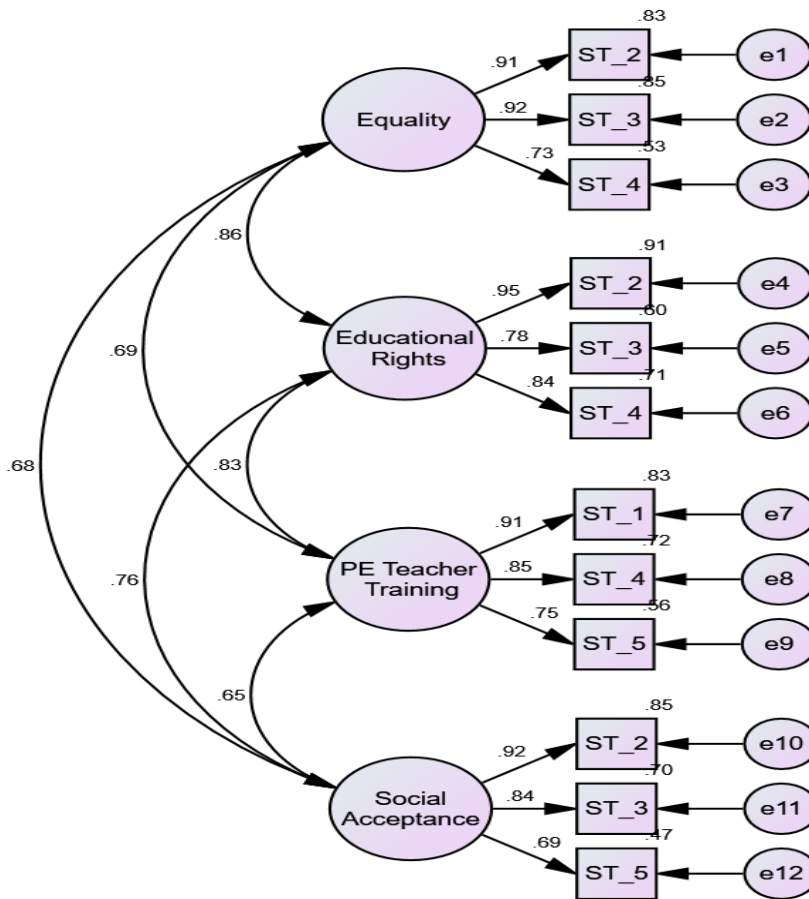

FIG-3 Path Diagram of Section-C Future Approaches: TPEFAQ

The model's goodness of fit was assessed through various indices, including the $\chi2$ and the $\chi2/df$ (cutoff ≤ 3) (Herbert,1994), other fit indices and incremental indices were also calculated, including the root mean square residual (RMR; cutoff ≤ 0.05), the goodness-of-fit index (GFI; cutoff ≥ 0.90) (Tanaka,1985), the Tucker Lewis index (TLI; cutoff ≥ 0.90) (Bentler,1980), the comparative fit index (cutoff ≥ 0.90) (Bentler,1990), and the root mean square error of approximation (RMSEA; between 0.08 and 0.1 are marginal (Browne,1993). Error of Approximation, RMR=Root Mean Square Residual, TLI= Tucker Lewis index were calculated. Results are presented in Table 5, with values generally meeting recommended criteria.

Table 5: Confirmatory factor analysis fit indices for the TPEFAQ Model in AMOS

	Recommended Value	Models Indicates
$\chi2/df$	<3	1.491
GFI	>0.9	0.855
TLI	>0.9	0.950
CFI	>0.9	0.964
RMR	< 0.05	0.046

RMSEA	<0.1	0.084

Table 5 presents a comprehensive evaluation of the confirmatory factor analysis (CFA) fit indices for the Trans PE Future Approaches Questionnaire (TPEFAQ) model in AMOS, aiming to assess the goodness of fit. results shows the results of indicators model for examining the factor structure of the questionnaire through CFA. Based on the indicators' values the model is fit as the obtained values of indices are as per the recommended values.

Convergent validity and discriminant validity are two aspects of construct validity, which assess the degree to which a measurement instrument accurately measures the underlying constructs or concepts it is intended to represent (Hill, 2007). The composite reliability of each construct is higher than 0.6 as well as greater than the average variance extracted. Generally, factor loadings and CR should be equal to or greater than 0.7 for good convergent validity (Kim, 2016; Gefen, 2000). The extracted average variance (AVE) should be higher than the multiple share variance (MSV) (Almén, 2018). The AVE and MAS results indicate that AVE is higher than MSV. This verifies that the existence of convergent validity in the instrument. The MSV indicates the discriminant validity.

Table 6: Convergent and Discriminant Validity Measure of various construct

Construct	CR	AVE	MSV
F1	0.894	0.739	0.737
F2	0.895	0.740	0.737
F3	0.876	0.704	0.688
F4	0.860	0.675	0.575

CR=Critical Ratio, AVE=Average Variance Extracted, MSV=Maximum Shared Variance

Table 4 presented a comprehensive evaluation of convergent and discriminant validity measures for various constructs within the model, with the primary goal of ensuring the measurement instrument's accuracy in representing the intended underlying concepts. Each construct demonstrated robust reliability, surpassing the recommended threshold of 0.6 (Kim, 2016; Gefen, 2000) for composite reliability (CR) and exceeding the average variance extracted (AVE). Adhering to the criteria for good convergent validity, factor loadings and CR values equal to or greater than 0.7 were evident for all constructs (F1 to F4). The comparison between AVE and maximum shared variance (MSV) further validated convergent validity, with consistently higher AVE values than MSV values, underscoring that a substantial proportion of the variance in indicators is attributable to the underlying constructs. Discriminant validity, as indicated by MSV values falling within an acceptable range, confirmed the ability of the measurement instrument to accurately differentiate between constructs. In summary, the overall findings from Table 4 affirm a well-fitted model, supported by favorable CR, AVE, and MSV values, highlighting the robustness of the measurement instrument in precisely capturing and distinguishing the intended constructs.

DISCUSSION

Based on the comprehensive analysis involving Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA), the present study recommended the utilization of the finalized questionnaire containing 12 questions. The questionnaire underwent a rigorous validation process, ensuring its reliability and validity in capturing the intended constructs related to transgender inclusion in Physical Education. The factors identified through EFA were confirmed in the CFA, affirming the stability and consistency of the instrument. The factor of Equality captures various aspects with a high percentage of variance explained (81.925%), it suggests that the included variables (ST_2, ST_3, and ST_4) collectively represent a significant portion of the underlying constructs. ST_1 and ST_5, with communalities below the average were deleted from this factor likely they didn't significantly impact its overall representation, indicating that these variables might not contribute substantially to the concept of equality within this context. The factor related to Educational Rights also exhibits a high percentage of variance explained (82.118%), indicating that the variables (ST_2, ST_3, and ST_4) adequately represent the construct. Again, ST_1 and ST_5 with communalities below the average have been deleted they did not seem to substantially affect the factor's representation. This suggests that within the context of educational rights, these two variables might not be as crucial in capturing the essence of the construct compared to the others. In the context of Physical Education (PE) Teacher Training, the percentage of variance explained is slightly lower at 79.918%. This suggests that while the included variables (ST_1, ST_4, and ST_5) contribute significantly to the overall construct, there may be some aspects not fully captured by these variables alone. ST_2 and ST_3 with communalities below the average were deleted from this factor and they didn't drastically impact its representation, indicating that these variables might not be as essential in defining the construct of PE teacher training within this specific framework. For the factor of Social Acceptance, the percentage of variance explained is 78.140%. While still substantial, it is comparatively lower than the previous factors discussed. This suggests that there may be more variability within the included variables (ST_2, ST_3, and ST_5) regarding their contribution to the construct of social acceptance. ST_1 and ST_4 with communalities below the average were deleted from this factor and they did not seem to significantly affect its representation, implying that these variables might not be as central to the concept of social acceptance within this particular context. The percentage of variance explained provides insight into how well the included variables represent the underlying constructs. Deletion of certain variables within each factor indicates their

relative importance in capturing the essence of the construct being measured. The reliability coefficients, convergent validity measures, and fit indices collectively supported the strength of the questionnaire. Researchers and practitioners in the field of Physical Education were encouraged to employ this validated tool to gather valuable insights into perceptions and attitudes regarding transgender inclusion, contributing to the ongoing efforts for creating more inclusive educational environments.

Table 7: Trans PE Future Approaches Questionnaire (TPEFAQ):

Equality	S.D	D	U.D	A	S.A
To ensure equality for transgender students in the physical education domain:					
1 Anti-bullying and Anti-harassment policies should be implemented					
2 Create an inclusive and supportive environment					
3 The inclusive curriculum should be adapted					
Educational Rights					
To ensure transgender students pursue their educational rights in the physical education domain:					
1 Digital platforms should be established to inform educational rights					
2 A committee should be formed to guarantee equal access					
3 Legal frameworks should be developed to secure a safe and protected environment					
Physical Education Teacher Training					
To educate physical education teachers about transgender students pursuing physical education domain:					
1 A gender sensitization orientation course should be introduced.					
2 Practical strategies should be created to foster a welcoming inclusive environment.					
3 Respectful language and behaviour should be practiced					
Societal Acceptance					
To ensure social acceptance, for transgender students pursuing the physical education domain:					
1 A safe classroom environment should be created					
2 Learning, recreational, and leisure activities should be provided on an equal basis					
3 Equal participation in activities should be ensured					

S.D= Strongly Disagree, D=Disagree, U.D=Undecided, A=Agree, S.A= Strongly Agree

The study effectively introduced a comprehensive questionnaire, the Trans PE Future Approaches Questionnaire (TPEFAQ), designed to assess teacher perceptions regarding transgender inclusion in physical education (PE). The questionnaire employed a well-structured four-factor model, each comprising three items, to encapsulate the multifaceted goals of inclusion for transgender individuals. The results indicated that the development of short and reliable scales had been achieved, with satisfactory discriminatory power of items and a high Cronbach's α coefficient, along with favorable validity and reliability indices, validating its efficacy as a valuable tool for understanding future approaches in the realm of transgender inclusion in Indian physical education.

The four-factorial structure revealed crucial dimensions of transgender inclusion. The first factor, interpreted as 'Equality,' within PE settings is paramount. This factor encompassed goals related to implementing anti-bullying and anti-harassment policies, creating an inclusive and supportive environment, and adapting the curriculum to foster equality. Víctor et al. (2016) was advocate for pedagogical approaches that challenge stereotypes and promote inclusivity in PE, emphasizing the importance of equality in educational contexts.The second factor emphasized 'Educational Rights,'for transgender students is crucial. This factor includes goals such as establishing digital platforms for informing educational rights, forming committees to guarantee equal access, and developing legal frameworks for a safe and protected environment. José et al. (2018) call for reflection to inform inclusive PE environments, highlighting the need to uphold the educational rights of transgender individuals.The third factor focused on 'PE Teacher Training,'plays a significant role in fostering transgender inclusion. This factor was incorporatinggoals like introducing gender orientation courses, practical strategies, and promoting respectful language.Sydney et al. (2022) stress the importance of transformative practices and policies, underscoring the need for comprehensive PE teacher training programs. The fourth factor addressed 'Social Acceptance,'transgender individuals is essential for creating an inclusive PE environment. This factor includes encompassing goals related to ensuring a safe classroom environment, providing activities and learning opportunities on an equal basis, and promoting equal participation.Kettley-Linsell et al. (2022) emphasize recognizing and respecting diverse gender performances, reflecting broader societal attitudes toward transgender individuals.

Correlations between these inclusion goals and the factors of equality, educational rights, physical education teacher training, and societal acceptance provided initial indications of the validity of the TPEFAQ. The questionnaire emerged as a valuable tool for offering a comprehensive insight into teachers' perceptions, fostering a holistic understanding of the current state, and identifying areas for improvement and growth. Notably, the TPEFAQ's ability to pinpoint specific dimensions in need of attention allowed for the development of targeted strategies, ensuring a more significant impact on fostering transgender inclusion and ensuring that everyone has equal access to opportunities for physical activity and education*.*

As inclusive policies gained recognition in PE, the TPEFAQ was positioned as a valuable instrument for shaping such policies. By capturing teachers' perspectives on future approaches, the questionnaire contributed essential data that could inform the development of policies promoting a more inclusive and supportive environment for transgender students in physical education. Furthermore, the TPEFAQ served as a foundation for modified professional development

opportunities. Teachers could use the results to design training programs addressing specific needs and challenges related to transgender inclusion. This approach enhanced educators' competence and confidence in creating inclusive PE environments. Overall, the study's findings underscored the importance of the TPEFAQ in facilitating positive changes in Indian Physical Education, contributing to a more equitable and supportive educational experience for all students, regardless of their gender identity.

Conclusion

In conclusion, this study introduces the Trans PE Future Approaches Questionnaire (TPEFAQ), designed to assess faculty perceptions of transgender inclusion in Indian Physical Education. Through development and validation processes, the TPEFAQ, comprising four factors (Equality, Educational Rights, PE Teacher Training, and Societal Acceptance), demonstrated high reliability and validity. The questionnaire offers valuable insights into attitudes, identifies areas for improvement, and serves as a tool for determining future approaches to transgender inclusion in Indian Physical Education, contributing to a more inclusive and supportive educational experience. The study recommends implementing the questionnaire in educational institutions for policy guidance. Collaboration with transgender advocacy groups, ongoing research, and result dissemination are crucial for a comprehensive approach. Policymakers and educators should collaborate into actionable strategies, fostering equity in Physical Education for transgender individuals. Future studies should expand the TPEFAQ's global application, providing a broader understanding of challenges in transgender inclusion on global scale.

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Conflict of interest

The authors declared no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

Reference

1. Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin, 107*(2), 238.
2. Bentler, P. M., & Bonett, D. G. (1980). Significance tests and goodness of fit in the analysis of covariance structures. *Psychological Bulletin, 88*(3), 588.
3. Bhattacharya, D., & Dogra, D. K. (2022). Transgender and physical education in India: Challenges. *International Journal of Physical Education Health & Sports Sciences, 11*(Special Issue), 294-300. Retrieved from https://www.researchgate.net/publication/370230305
4. Bhattacharya, S., Ghosh, D., & Purkayastha, B. (2022). Transgender Persons (Protection of Rights) Act' of India: An analysis of substantive access to rights of a transgender community. *Journal of Human Rights Practice, 14*(2), 676–697. https://doi.org/10.1093/jhuman/huac004
5. Browne, M. W., &Cudeck, R. (1992). Alternative ways of assessing model fit. *Sociological Methods & Research, 21*(2), 230-258. https://doi.org/10.1177/0049124192021002005
6. Census. (2011). Transgender in India. Retrieved from https://www.census2011.co.in/transgender.php
7. Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika, 16*(3), 297-334.
8. Das, P. (2019). Higher education of transgenders in India: Opportunities and challenges. *International Journal of Research in Engineering, Science and Management, 2*(2), 371-375.
9. Devís-Devís, J., Pereira-García, S., Fuentes-Miguel, J., López-Cañada, E., & Pérez-Samaniego, V. (2018). Opening up to trans persons in physical education–sport tertiary education: Two case studies of recognition in queer pedagogy. *Physical Education & Sport Pedagogy*. https://doi.org/10.1080/17408989.2018.1485142
10. Devís-Devís, J., Pereira-García, S., López-Cañada, E., Pérez-Samaniego, V., & Fuentes-Miguel, J. (2018). Looking back into trans persons' experiences in heteronormative secondary physical education contexts. *Physical Education and Sport Pedagogy, 23*(1), 103–116. https://doi.org/10.1080/17408989.2017.1341477
11. Devís-Devís, J., Pereira-García, S., Valencia-Peris, A., Fuentes-Miguel, J., López-Cañada, E., & Pérez-Samaniego, V. (2017). Harassment patterns and risk profile in Spanish trans persons. *Journal of Homosexuality, 64*(2), 239–255. https://doi.org/10.1080/00918369.2016.1179027
12. Drury, S., Stride, A., Firth, O., & Fitzgerald, H. (2022). The transformative potential of trans*-inclusive PE: The experiences of PE teachers. *Sport, Education and Society, 28*, 1-14. https://doi.org/10.1080/13573322.2022.2034142
13. Ferguson, D. L. (2008). International trends in inclusive education: The continuing challenge to teach each one and everyone. *European Journal of Special Needs Education, 23*(2), 109-120. https://doi.org/10.1080/08856250801946236

14. Fuentes-Miguel, J., Pérez-Samaniego, V., López-Cañada, E., Pereira-García, S., &Devís-Devís, J. (2023). From inclusion to queer-trans pedagogy in school and physical education: A narrative ethnography of trans generosity. *Sport, Education and Society, 28*(9), 1132-1145. https://doi.org/10.1080/13573322.2022.2073437

15. Gefen, D., Straub, D., & Boudreau, M. C. (2000). Structural equation modeling and regression: Guidelines for research practice. *Communications of the Association for Information Systems, 4*(1), 7.

16. Haug, P. (2017). Understanding inclusive education: Ideals and reality. *Scandinavian Journal of Disability Research, 19*(3), 206-217. https://doi.org/10.1080/15017419.2016.1224778

17. Herbert, W., & John, B. (1994). Goodness of fit in confirmatory factor analysis: The effects of sample size and model parsimony. *Qual Quant, 28*(2), 185-217.

18. Hill, C. R., & Hughes, J. N. (2007). An examination of the convergent and discriminant validity of the Strengths and Difficulties Questionnaire. *School Psychology Quarterly, 22*(3), 380–406. https://doi.org/10.1037/1045-3830.22.3.380

19. Hinchy, J. (2019). Governing gender and sexuality in colonial India: The Hijra, c.1850-1900. Cambridge University Press. https://doi.org/10.1017/9781108592208

20. Kataria, R. L. (2019). Welfare of transgenders [Press release]. Minister of State for Social Justice and Empowerment, PIB Delhi. Retrieved from https://pib.gov.in/PressReleasePage.aspx?PRID=1575534

21. Kerala Development Society. (2017). Study on human rights of transgender as a third gender. Retrieved from https://nhrc.nic.in/sites/default/files/Study_HR_transgender_03082018.pdf

22. Kettley-Linsell, H., Sandford, R., & Coates, J. (2022). Negotiating gender performances in physical education and school sport: Gender diversity and inclusive practices. Loughborough University. https://hdl.handle.net/2134/20043638.v1

23. Kim, H., Ku, B., Kim, J. Y., Park, Y. J., & Park, Y. B. (2016). Confirmatory and exploratory factor analysis for validating the Phlegm Pattern Questionnaire for healthy subjects. *Evidence-based Complementary and Alternative Medicine*. https://doi.org/10.1155/2016/2696019

24. Knekta, E., Runyon, C., & Eddy, S. (2019). One size doesn't fit all: Using factor analysis to gather validity evidence when using surveys in your research. *CBE Life Sciences Education, 18*(1), rm1. https://doi.org/10.1187/cbe.18-04-0064

25. Lynch, S., Davies, L., Ahmed, D., & McBean, L. (2022). Complicity, trauma, love: An exploration of the experiences of LGBTQIA+ members from physical education spaces. *Sport Education and Society*. https://doi.org/10.1080/13573322.2022.2141216

26. Michelraj, M. (2015). Historical evolution of transgender community in India. *Asian Review of Social Sciences, 4*(1), 17-19. Retrieved from https://www.trp.org.in/wp-content/uploads/2015/10/ARSS-Vol.4-No.1-Jan-June-2015-pp.17-19.pdf

27. Ministry of Law and Justice. (2019). The Transgender Persons (Protection of Rights) Act 2019. Retrieved from https://www.argus-p.com/uploads/km_updates/download/1606196456_Implementation_Of_The_Transgender_Persons_(Protection_Of_Rights)_Act_And_Rule_For_All_Establishments.pdf

28. Pérez-Samaniego, V., Fuentes-Miguel, J., Pereira-García, S., Devís-Devís, J. (2016). Abjection and alterity in the imagining of transgender in physical education and sport: A pedagogical approach in higher education. *Sport Education and Society*. https://doi.org/10.1080/13573322.2014.981253

29. Pérez-Samaniego, V., Fuentes-Miguel, J., Pereira-García, S., López-Cañada, E., &Devís-Devís, J. (2019). Experiences of trans persons in physical activity and sport: A qualitative meta-synthesis. *Sport Management Review, 22*(4), 439-451.

30. Qi, J., & Ha, A. S. (2012). Inclusion in physical education: A review of literature. *International Journal of Disability, Development and Education, 59*(3), 257-281. https://doi.org/10.1080/1034912X.2012.697737

31. Tanaka, J. S., & Huba, G. J. (1985). A fit index for covariance structure models under arbitrary GLS estimation. *British Journal of Mathematical and Statistical Psychology, 38*(2), 197-201.