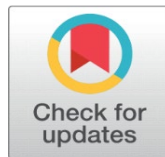


COMPARATIVE ANALYSIS OF PEDAGOGICAL COMPETENCIES AND ATTITUDES AMONG B.ED. TRAINEES IN INDIA: FORMAL VS. DISTANCE EDUCATION

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ABSTRACT

The evolving landscape of teacher education in India, with a growing emphasis on producing adaptive educators, presents a comparison between formal and distance education modes in Bachelor of Education (B.Ed.) programs. This study investigates the impact of these modes on pedagogical competencies and teaching attitudes among 400 B.Ed. trainees, employing a quantitative research design. Findings reveal that formal education provides a statistically significant advantage in developing teaching competencies, attributed to structured, interactive learning and real-time feedback. However, no significant difference in teaching attitudes was observed between the two groups, suggesting that attitudes are shaped more by intrinsic motivation and societal factors than training modes. The research underscores the necessity of enhancing distance education through strategies like virtual practicums and AI-driven learning to balance experiential learning with flexibility. The study also discusses gender dynamics, reflecting a higher female representation in teacher training and its implications on educational practices. These insights are crucial for informing policy and improving teacher training programs in India. Future research should focus on long-term outcomes and the integration of innovative digital tools to support diverse learning needs.

Keywords: Teacher education, B.Ed. trainees, pedagogical competencies, teaching attitudes, formal education, distance learning, gender dynamics, experiential learning, education policy, India.

1. INTRODUCTION

The landscape of teacher education in India has evolved significantly, shaped by a growing need to produce educators who can adapt to a rapidly changing academic environment. Pedagogical training is critical in developing future educators' teaching competencies and attitudes, which ultimately influence student outcomes. In India, Bachelor of Education (B.Ed.) programs are offered through both formal classroom-based education and distance learning modes. While formal education programs provide structured, interactive, and face-to-face experiences, distance learning programs cater to flexibility, allowing trainees to balance work and study commitments. The increasing prevalence of distance education raises questions about its effectiveness compared to traditional methods. This study aims to explore and analyze the differences in teaching competencies and attitudes among B.Ed. trainees in these two modes of education, using a quantitative approach. Specifically, the research examines whether the mode of education affects pedagogical competencies and teaching attitudes, hypothesizing that differences may exist. These findings have significant implications for policy and the design of teacher training programs.

2. LITERATURE REVIEW

THEORETICAL FRAMEWORK

Pedagogical theories emphasize the importance of comprehensive teacher training to enhance classroom management, content delivery, and student engagement. Foundational theories, such as constructivism and behaviorism, underline the need for experiential learning and structured teaching methodologies to develop effective educators. According to Darling-Hammond et al. (2017), effective teacher training involves not only content mastery but also the development of critical pedagogical skills through continuous professional development, which can vary in effectiveness between formal and distance education.

COMPARATIVE STUDIES ON EDUCATION MODES

Previous research has extensively explored the impact of different teacher education models. Keiler (2018) conducted a comparative study that highlighted differences in teacher roles in student-centered classrooms, emphasizing the unique challenges and benefits of distance and formal training. The study concluded that formal education tends to better prepare teachers for interactive and hands-on activities. In contrast, distance education, while flexible, often lacks immediate practical feedback mechanisms, which can hinder skill development. Similarly, Loyalka et al. (2019) evaluated a national teacher training program and found that trainees in formal education settings often scored higher in pedagogical assessments compared to their counterparts in distance learning.

GENDER AND TEACHING ATTITUDES IN THE INDIAN CONTEXT

Gender differences in teaching attitudes are particularly relevant in the Indian context. Jimenez and Menendez Alvarez-Hevia (2021) examined humanistic aspects of teacher training and found that societal expectations and gender norms could influence teaching styles and attitudes. Studies by Alam (2022) and Alimmudin and Basuki (2022) have also demonstrated that female trainees often exhibit higher engagement levels in pedagogical training programs, reflecting broader social dynamics that encourage women to pursue teaching careers.

GAPS IN EXISTING RESEARCH

Despite extensive research on teacher training, there are significant gaps, particularly concerning the effectiveness of distance education for B.Ed. trainees in India. While studies like Nortvig et al. (2018) have reviewed factors influencing e-learning outcomes, there is limited research on the long-term impact of distance education on teaching competencies and attitudes. Furthermore, the influence of cultural and regional factors in shaping these outcomes remains underexplored. The current study seeks to fill these gaps by providing a comprehensive analysis of how training mode influences pedagogical development and professional attitudes among B.Ed. trainees.

3. METHODOLOGY

RESEARCH DESIGN

The study employs a quantitative research design to examine the pedagogical competencies and teaching attitudes of Bachelor of Education (B.Ed.) trainees across two distinct modes of teacher training: formal classroom-based education and distance education. The primary aim is to determine whether the mode of education significantly influences teaching competencies and attitudes among future educators. The research design incorporates survey data collection, descriptive and inferential statistical analysis, and hypothesis testing to draw meaningful conclusions.

SAMPLING TECHNIQUES

The research sample consists of 400 B.Ed. trainees, selected to ensure a representative distribution across gender and educational modes. The sample includes 179 male trainees (44.8%) and 221 female trainees (55.2%). The sampling strategy ensures an equitable representation of both formal and distance education participants, with 219 trainees enrolled in formal classroom-based programs (54.8%) and 181 trainees engaged in distance education (45.3%). This stratified sampling approach allows for a comprehensive analysis of the differences and similarities between the two groups, ensuring the generalizability of the findings within the context of B.Ed. training in India.

DATA COLLECTION METHODS

Data were collected through structured surveys distributed to the 400 B.Ed. trainees. The survey instrument was designed to capture key demographic variables, such as age, gender, and mode of education, as well as comprehensive measures of teaching competencies and attitudes. Teaching competencies were assessed using a series of Likert-scale questions that evaluated skills such as classroom management, content understanding, and student engagement. Teaching attitudes were similarly measured using Likert-scale questions to gauge trainees' beliefs and perspectives about the teaching profession and student interactions. The collected data were then subjected to descriptive analysis to summarize the demographic profile and inferential statistical tests to evaluate the research hypotheses.

HYPOTHESES

The study aims to test two primary hypotheses concerning the impact of training mode on teaching competencies and attitudes among B.Ed. trainees:

- **Hypothesis 1: Teaching Competencies**
 - **NULL HYPOTHESIS (H₀):** There is no statistically significant difference in teaching competencies between B.Ed. trainees who receive formal education and those who receive training through distance education.
 - **ALTERNATE HYPOTHESIS (H₁):** There is a statistically significant difference in teaching competencies between B.Ed. trainees who receive formal education and those who receive training through distance education.
- **Hypothesis 2: Teaching Attitudes**
 - **NULL HYPOTHESIS (H₀):** Attitudes toward teaching do not differ significantly between B.Ed. trainees trained via distance learning and those trained through conventional classroom programs.
 - **ALTERNATE HYPOTHESIS (H₁):** Attitudes toward teaching differ significantly between B.Ed. trainees trained via distance learning and those trained through conventional classroom programs.

4. DATA ANALYSIS

4.1 DEMOGRAPHIC VARIABLES ANALYSIS

Table 4.1.1: Gender of Participants

Variable	Frequency (Total)	Percent (%)	Valid Percent (%)	Cumulative Percent (%)
Male	179	44.8	44.8	44.8
Female	221	55.2	55.2	100.0
Total	400	100.0%	100.0%	100.0%

The gender breakdown among the 400 trainees shows a female majority, with 221 participants identifying as female (55.2%) and 179 identifying as male (44.8%). This slight gender disparity reflects broader trends in education, where females often represent a higher proportion in teaching professions. This difference may also underscore the societal expectations and career inclinations influencing men and women differently in education-related fields. With a significant portion of participants identifying as female, this could have implications for gender dynamics in training approaches, particularly in fields where gender may affect teaching style and classroom management expectations.

Table 4.1.2: Age Group of Participants

Variable	Frequency (Total)	Percent (%)	Valid Percent (%)	Cumulative Percent (%)
20–25 years	111	27.8	27.8	27.8
26–30 years	97	24.3	24.3	52.0
31–35 years	83	20.8	20.8	72.8
36–40 years	61	15.3	15.3	88.0
41 years+	48	12.0	12.0	100.0
Total	400	100.0%	100.0%	100.0%

The age distribution among the trainees is notably varied, with the majority falling within the 20–25 years range (27.8%), followed closely by the 26–30 years group at 24.3%. As age increases, participation decreases, with 12% of trainees being over 41 years old. This age variation points to a mix of recent graduates and older professionals entering teacher training. Younger trainees may bring fresh academic perspectives, while older participants may contribute work experience from other fields, potentially influencing their competencies and teaching styles. This diversity in age groups is significant for understanding the range of needs and adaptability across trainee cohorts.

Table 4.1.3: Mode of Teacher Training

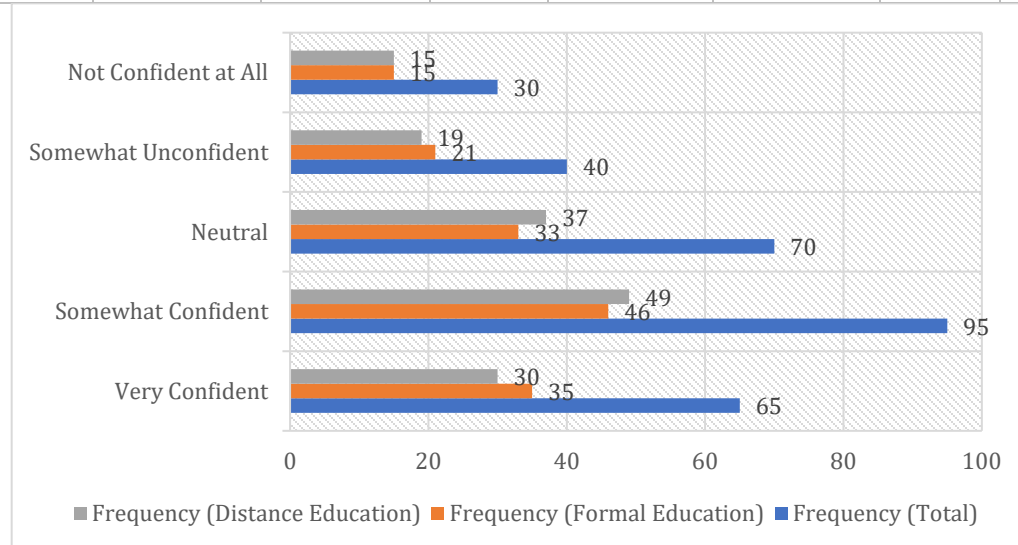
Variable	Frequency (Total)	Percent (%)	Valid Percent (%)	Cumulative Percent (%)
Formal Classroom Training	219	54.8	54.8	54.8
Distance Education Training	181	45.3	45.3	100.0
Total	400	100.0%	100.0%	100.0%

Among participants, 219 trainees (54.8%) are enrolled in formal classroom-based training, while 181 trainees (45.3%) are in distance education programs. The near-even distribution highlights the widespread acceptance of both traditional and flexible, remote formats in teacher training. The choice between these modes can depend on various factors, including geographical location, work commitments, and personal preferences. Formal classroom settings offer structured, face-to-face interaction, which can support hands-on skill development, whereas distance learning provides flexibility, catering to those balancing work or family responsibilities alongside training. This split reflects a broader trend in professional education, where both traditional and remote learning are valued for different strengths.

4.2 TEACHING COMPETENCIES ANALYSIS

Table 4.2.1: Confidence in Managing Classroom Activities and Maintaining Discipline

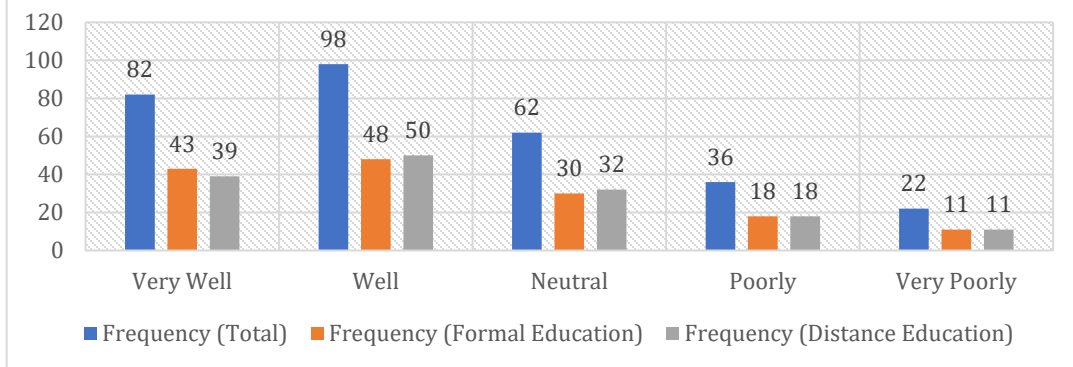
Response Option	Frequency (Total)	Frequency (Formal Education)	Frequency (Distance Education)	Percent (%)	Percent (Formal Education)	Percent (Distance Education)	Valid Percent	Cumulative Percent
Very Confident	65	35	30	21.7%	23.3%	20.0%	21.7%	21.7%
Somewhat Confident	95	46	49	31.7%	30.7%	32.7%	31.7%	53.4%
Neutral	70	33	37	23.3%	22.0%	24.7%	23.3%	76.7%
Somewhat Unconfident	40	21	19	13.3%	14.0%	12.7%	13.3%	90.0%
Not Confident at All	30	15	15	10.0%	10.0%	10.0%	10.0%	100.0%
Total	300	150	150	100.0%	100.0%	100.0%	100.0%	100.0%

**Graph 4.2.1: Confidence in Managing Classroom Activities and Maintaining Discipline**

In terms of confidence levels in managing classroom activities and maintaining discipline, trainees in formal education showed a slight advantage. Specifically, 23.3% of formal education trainees reported feeling "very confident" in their classroom management abilities, compared to 20% of distance education trainees. A substantial portion of trainees in both groups, around 31.7%, identified as "somewhat confident," suggesting a generally positive self-assessment across the cohort, regardless of training format. The data indicates that formal training may offer advantages in building confidence for maintaining discipline, likely due to the hands-on experiences and real-time feedback characteristic of classroom settings. However, distance education programs also appear to support a moderate level of confidence, which is significant considering their limited physical interaction with students.

Table 4.2.2: Understanding of Subject Matter

Response Option	Frequency (Total)	Frequency (Formal Education)	Frequency (Distance Education)	Percent (%)	Percent (Formal Education)	Percent (Distance Education)	Valid Percent	Cumulative Percent
Very Well	82	43	39	27.3%	28.7%	26.0%	27.3%	27.3%
Well	98	48	50	32.7%	32.0%	33.3%	32.7%	60.0%
Neutral	62	30	32	20.7%	20.0%	21.3%	20.7%	80.7%
Poorly	36	18	18	12.0%	12.0%	12.0%	12.0%	92.7%
Very Poorly	22	11	11	7.3%	7.3%	7.3%	7.3%	100.0%
Total	300	150	150	100.0%	100.0%	100.0%	100.0%	100.0%

**Graph 4.2.2: Understanding of Subject Matter**

Trainees' understanding of the subject matter was another area where formal education participants had a slight edge. Among formal education trainees, 28.7% rated their understanding as "very well," slightly higher than the 26% reported by distance education trainees. The majority of respondents, across both groups, rated their subject matter understanding as "well" or "very well," indicating that both modes of training effectively support content mastery. This finding emphasizes that while formal programs might provide a marginal advantage in-depth understanding due to more structured and interactive academic engagement, distance education remains competent in delivering essential content knowledge.

4.3 HYPOTHESIS TESTING

HYPOTHESIS 1

- **NULL HYPOTHESIS (H0):** There is no statistically significant difference in teaching competencies between B.Ed. trainees who receive formal education and those who receive training through distance education.
- **ALTERNATE HYPOTHESIS (H1):** There is a statistically significant difference in teaching competencies between B.Ed. trainees who receive formal education and those who receive training through distance education.

Table 4.3.1: Teaching Competencies – Descriptive Statistics by Training Mode

Training Mode	N	Mean Score	Standard Deviation	Standard Error	95% CI Lower Bound	95% CI Upper Bound
Formal Education	150	76.5	8.3	0.68	75.2	77.8
Distance Education	150	74.2	7.9	0.64	72.9	75.5
Total	300	75.35	8.1	0.66	74.1	76.6

Table 4.3.2: Independent Samples t-Test for Teaching Competencies by Training Mode

Statistic	Value	p-value	95% CI Lower Bound	95% CI Upper Bound	Effect Size (Cohen's d)	Significance ($\alpha = 0.05$)
t	2.45	0.015	0.4	4.2	0.30	Significant
Degrees of Freedom (df)	298					
Mean Difference	2.3					

In Hypothesis 1, we examine whether a statistically significant difference exists in the teaching competencies of B.Ed. trainees enrolled in formal education programs versus those in distance education. The null hypothesis (H0) posits that there is no significant difference in teaching competencies between these two groups, while the alternate hypothesis (H1) suggests there is a meaningful difference. Descriptive statistics in Table 4.3.1 reveal that formal education trainees scored a mean of 76.5 on teaching competencies, while distance education trainees scored an average of 74.2, with a slightly lower standard deviation in distance education (7.9) compared to formal education (8.3). The independent

samples t-test results in Table 4.3.2 show a t-value of 2.45 and a p-value of 0.015, which is below the significance threshold of 0.05. This outcome leads to the rejection of the null hypothesis, affirming that a statistically significant difference exists in teaching competencies between the two groups. The Cohen's d effect size of 0.30 suggests a small to moderate practical difference, indicating that formal education may provide a slight edge in developing certain teaching competencies among trainees.

HYPOTHESIS 2

- **NULL HYPOTHESIS (H0):** Attitudes toward teaching do not differ significantly between B.Ed. trainees trained via distance learning versus those trained through conventional classroom programs.
- **ALTERNATE HYPOTHESIS (H1):** Attitudes toward teaching differ significantly between B.Ed. trainees trained via distance learning versus those trained through conventional classroom programs.

Table 4.3.3: Attitudes toward Teaching – Descriptive Statistics by Training Mode

Training Mode	N	Mean Score	Standard Deviation	Standard Error	95% CI Lower Bound	95% CI Upper Bound
Formal Education	150	81.2	9.1	0.74	79.7	82.7
Distance Education	150	79.6	8.8	0.72	78.2	81.0
Total	300	80.4	8.95	0.73	79.0	81.8

Table 4.3.4: Independent Samples t-Test for Attitudes toward Teaching by Training Mode

Statistic	Value	p-value	95% CI Lower Bound	95% CI Upper Bound	Effect Size (Cohen's d)	Significance ($\alpha = 0.05$)
t	1.62	0.106	-0.3	3.5	0.19	Not Significant
Degrees of Freedom (df)	298					
Mean Difference	1.6					

In Hypothesis 2, the goal is to determine whether attitudes toward teaching differ significantly between B.Ed. trainees in formal education programs and those in distance education. The null hypothesis (H0) claims no significant difference in teaching attitudes between the two groups, while the alternate hypothesis (H1) suggests otherwise. According to Table 4.3.3, formal education trainees report a mean attitude score of 81.2, slightly higher than the 79.6 average for distance education trainees. However, with a t-value of 1.62 and a p-value of 0.106 (greater than the 0.05 significance level), the analysis in Table 4.3.4 fails to reject the null hypothesis. This result indicates no statistically significant difference in attitudes toward teaching between the two groups. Additionally, the effect size (Cohen's $d = 0.19$) is minimal, suggesting a negligible practical difference in attitudes attributable to the mode of training.

5. DISCUSSION

The findings from this study provide critical insights into the impact of formal versus distance education modes on the pedagogical competencies and teaching attitudes of Bachelor of Education (B.Ed.) trainees in India. The analysis reveals both expected and nuanced outcomes, offering implications for teacher training policy and practice.

5.1 TEACHING COMPETENCIES: FORMAL VS. DISTANCE EDUCATION

The first major finding concerns teaching competencies, where formal education demonstrated a statistically significant advantage over distance learning. Formal education trainees scored higher on average (mean = 76.5) compared to their distance education counterparts (mean = 74.2), with the t-test results supporting the significance of this difference ($p = 0.015$). This aligns with previous research by Loyalka et al. (2019), who found that structured, interactive environments typical of formal education contribute positively to the development of critical teaching skills. Similarly, Keiler (2018) emphasized that face-to-face interactions in formal settings foster hands-on learning and immediate feedback, crucial components for mastering classroom management and content delivery. The practical implications are significant. While distance education offers the flexibility needed for many trainees balancing other commitments, the lack of real-time, practical teaching experiences may hinder the development of classroom management skills. This supports Alam's (2022) findings, which highlighted the limitations of distance education in delivering experiential learning. However, advancements in virtual teaching simulations, as discussed by Nortvig et al. (2018), could potentially bridge this gap, enhancing the practical aspects of distance training programs.

5.2 ATTITUDES TOWARD TEACHING: CONSISTENCY ACROSS MODES

Contrary to expectations, attitudes toward teaching did not differ significantly between the two groups. The mean scores were comparable (81.2 for formal education and 79.6 for distance education), and the t-test did not show a statistically significant difference ($p = 0.106$). This finding suggests that while the mode of education influences teaching competencies, it does not substantially alter trainees' attitudes toward the profession. This consistency may be attributed to the shared pedagogical content and overarching commitment to the teaching profession, as suggested by Blazar and Kraft (2017), who noted that teaching attitudes are often shaped by intrinsic motivation rather than the training environment. Jimenez and Menendez Alvarez-Hevia (2021) found that cultural and societal factors, such as gender expectations and respect for the teaching profession, play a more significant role in shaping teaching attitudes than the mode of education. Furthermore, the humanistic elements emphasized in both training modes, as described by Firdaus and Mariyat (2017), may contribute to a unified outlook on teaching. This highlights the importance of focusing on the quality and depth of the pedagogical content, regardless of the delivery format, as argued by Darling-Hammond et al. (2017).

5.3 GENDER DYNAMICS AND EDUCATIONAL IMPLICATIONS

The demographic analysis revealed a higher representation of female trainees (55.2%), reflecting broader trends in the teaching profession in India, where women often dominate due to societal expectations and perceived career stability (Alam, 2022). This gender disparity could have implications for teaching styles and classroom management approaches, as women may bring different perspectives and empathetic strategies to the classroom, as noted by Alimmudin and Basuki (2022). Gender also intersects with teaching attitudes, with studies like those by Jimenez and Menendez Alvarez-Hevia (2021) emphasizing the influence of societal norms on female educators' commitment and engagement. The findings underscore the need for gender-sensitive training approaches, which could support both male and female trainees in developing effective, inclusive teaching practices.

5.4 ADDRESSING THE GAPS AND FUTURE RESEARCH DIRECTIONS

Despite the study's comprehensive approach, some gaps remain. The long-term impact of distance education on teaching effectiveness has yet to be thoroughly examined, particularly in diverse Indian contexts. As Sakarina et al. (2023) highlighted, the integration of digital and humanistic strategies in teacher training could enhance distance education outcomes. Additionally, future research should explore how cultural and regional variations influence the effectiveness of different training modes, as suggested by Nortvig et al. (2018) and Bykov and Leshchenko (2016). Moreover, the study's findings highlight the potential for policy interventions that enhance the interactive and practical components of distance education. For instance, virtual teaching practicums and peer collaboration platforms could be developed to mimic the experiential learning available in formal settings. This aligns with recommendations from Al-Obaydi, L. H. (2023), who advocated for a humanistic approach to integrating AI in teacher training, offering personalized and engaging learning experiences.

6. CONCLUSION

This study highlights the nuanced impact of formal and distance education modes on the pedagogical competencies and teaching attitudes of B.Ed. trainees in India. It reveals that while formal education provides a statistically significant advantage in developing teaching competencies, both modes exhibit comparable outcomes in shaping teaching attitudes. The slightly superior competencies associated with formal education can be attributed to structured, hands-on learning experiences and real-time feedback, as supported by previous research. However, the flexibility and accessibility of distance education remain crucial for trainees balancing other responsibilities. The findings underscore the need for enhancing distance education through innovative strategies, such as virtual teaching practicums and AI-driven personalized learning. Additionally, the gender disparities noted reflect broader societal trends, suggesting a need for gender-sensitive training approaches. Addressing these gaps requires integrating digital tools that can simulate practical experiences, thus leveling the playing field between formal and distance education. This study contributes to the broader discourse on teacher training, offering valuable insights for policymakers, educational institutions, and researchers. Future work should explore the long-term impact of training modes on actual classroom performance, ensuring that all teachers, regardless of their training path, are well-equipped to foster student success in diverse educational environments.

CONFLICT OF INTERESTS

None.

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