

GAMIFICATION TO IMPROVE LEARNERS' HANDWRITING IN PRIMARY AND MIDDLE SCHOOL STUDENTS OF HYDERABAD INSTITUTE OF EXCELLENCE

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Abstract: Good handwriting is essential for a student to develop during school days. Writing by hand involves intricate movements which activate more areas of the brain, and strengthen memory power, muscle power, and concentration span. The gamification concept was applied to improve students' handwriting in primary and middle school students. Game elements like points, badges, and prizes were used to motivate students. The research was carried out at Hyderabad Institute of Excellence, Mudgula Chitampally, Vikarabad District, Telangana State, India. A case study was used as a method in this research. Two rounds of handwriting competitions were conducted for both primary and middle school students, and qualitative and quantitative methods were used to collect data. Instant effective feedback was given to students based on their performance in the first round of the handwriting competition. The result shows that out of 240 students, 20 per cent of students got the best handwriting at the Hyderabad Institute of Excellence. Overall, 53 per cent of students showed improvement in their handwriting.

Keywords: Gamification, Handwriting, Primary and Middle School, Effective feedback.

Resumo: Uma boa caligrafia é uma habilidade essencial para um aluno desenvolver durante os dias de escola. Escrever à mão fortalece o poder da memória, a força muscular e o tempo de concentração. O conceito de gamificação foi usado para melhorar a caligrafia dos alunos do ensino fundamental e médio. Elementos do jogo como pontos, badges e prêmios foram usados para motivar os alunos. A pesquisa foi realizada no Hyderabad Institute of Excellence, Mudgula Chitampally, Vikarabad District, Telangana State, Índia. O estudo de caso foi utilizado como método nesta pesquisa. Duas rodadas de competições de caligrafia foram realizadas para alunos do ensino fundamental e médio, métodos qualitativos e quantitativos foram usados para coletar dados. Feedback efetivo instantâneo foi dado aos alunos com base no seu desempenho na primeira rodada da competição de caligrafia. O resultado mostra que de 240 alunos, 20 por cento dos alunos obtiveram a melhor caligrafia no Hyderabad Institute of Excellence. No geral, 53% dos alunos apresentaram melhorias na sua caligrafia.

Palavras-chave: Gamificação, Caligrafia, Ensino fundamental e médio, Feedback eficaz



The study was carried out at the Hyderabad Institute of Excellence (HIE), Mudgula Chitampally, Vikarabad District, Telangana State, India. The school is coeducational and having grades from one to eight with a total strength of 243 students, which is affiliated to the Central Board of Secondary Education (CBSE) of 3630213.

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After the Covid 19 pandemic, the school reopened in June 2023. The pandemic brought new challenges for teachers; they have to compete harder for students' attention against many factors, such as personal interests, video games, surfing the web, social media, cell phone apps, text messaging, and so on. Digital learning has provided easy access to files and folders that can now be organised and saved without any physical damage. With one click, students can access their notes and assignments without the fear of misplacing or spoiling them (Prakash, 2021). As a result, students failed against the habit of writing notes in the classroom.

Various studies state that the Covid 19 pandemic badly affected the students' writing skills. According to (Mishra, 2021) a teacher from an Indian public school stated that after the Covid 19 pandemic, most of the students found avoiding writing in the class, and some of them managed to write and it was not legible. A teacher from St Michael's School said that students feel uncomfortable while taking long dictations (Mishra, 2021). Principal Ms. Jyoti Arora of Mount Abu Public School Delhi also stated that students were reluctant to take notes when teachers were asked repeatedly to do so, and she checked some of their notebooks and their handwriting was simply illegible (Sharma, 2022). It seems that they have forgotten how to write during the two years of the pandemic since most of them attended online classes.

Educators, handwriting experts and occupational therapists say that two years of online classes have taken a severe toll on children's handwriting. A survey published after the Covid 19 pandemic also said that the handwriting of around 75% of the students in the country had been adversely affected (Sharma, 2022).

Handwriting plays a very important role in students' life. A professor of psychology from Patna University states that Handwriting could have cognitive benefits, artistic merit, and a personal touch, and it could help students to learn faster (Mishra, 2021). Writing by hand strengthens memory power, muscle power, and concentration span, which expands the cognitive ability to process information (Elango & Devi, 2022).

In HIE teachers have observed that the students were having challenges with their handwriting, especially in the lower classes; they are not taking seriousness about their handwriting. It is really very hard to raise enthusiasm in students to make them write neatly in their notebooks. Some of the students are very slow in writing and their writing ends up with incomplete works. Teachers tried their best to make the student write in good handwriting; at times they are writing in good, but later on, again back to their normal way of writing.

To overcome the challenges of students handwriting in HIE, gamification strategies were planned to implement. The term gamification is defined as the use of game elements in non-game contexts (Deterding et al., 2011). It can also be defined as a set of activities and processes to solve problems by using or applying the characteristics of game elements (Walter, 2022). Gamification focuses on game elements such as challenges, levels, avatars, points, achievements, stories, and leaderboards, in applying to non-game contexts which are the applications designed for non-entertainment purposes (Tondello, 2016).

The use of gamification strategies has the potential to facilitate students to focus on their handwriting to promote learners' motivation. 88% of students stated that they feel boosted by the motivation of game points for accomplishing certain tasks and they are being engaged in the activity (Lawrance et al., 2021). Through gamification, students feel involved in the process and

are called to be proactive so that they can empower their abilities and enhance their attitudes in the classroom environment (Coccoli et al., 2015).

To improve the handwriting of HIE students, we planned to conduct a handwriting competition from grade 1 to grade 8. Rubrics were created to evaluate the student's handwriting, and two rounds of evaluation were conducted. Game elements like points, badges, and prizes were used to motivate the students. Rapid feedback was given to students based on the evaluations. Remedial measures were taken by the school to improve the students handwriting after the first-round of the results. At the end of the handwriting competition, badges and prizes were distributed to the first top three students, who had scored high points in each grade. A case study was used as a method, and qualitative and quantitative methods were used to collect data. The two rounds of handwriting competition evaluations are described in the methodology.

METHODOLOGY

Good handwriting is an essential skill for a student to develop during his/her school days. According to (Khasanah, 2015) "writing is an activity to express ideas, events, feeling or thinking in written form that can be the tool to communicate with other people". Writing helps to develop the power of expression as words have to show exactly and accurately what one wants to express without leaving any chance of ambiguity. It works in many areas such as grammar, style and structure, and most important, handwriting. The conscious act of writing requires attention without distraction. It can be done only with a focused mind. This leads to the development of valuable attributes such as patience and persistence (Bhatnagar, 2022).

In HIE, the first round of the handwriting competition was conducted in the month of February 2023 for both primary and middle school students. Competition in an activity compares a student's performance to that of others, giving an amount of satisfaction to a higher level of performance based on the points. The competition journey is a process, not an endpoint. It enables students to benefit from the opportunity to challenge themselves and they will learn new things and develop new skills. Even if they don't win, they can still show what they gained from their experience (Bridgestock, 2022).

The following rubrics were used to evaluate the student's handwriting, which was assigned as points on an ordinal scale of 1 to 5.

Good formation of a letter - to ensure that the student can correctly form the alphabet with a specific order of capital or small letters.

Space between Letters and Words – to analyse that the student is given enough spaces between the letters and words to enhance the readability and legibility for the reader.

Letters are sized appropriately and consistently – to check that the student's handwritten letters are sized appropriately and consistently throughout the sessions.

Spelling mistakes – to make students aware that the points will be deducted for spelling mistakes to ensure they write correct spellings.

Neatness – to motivate students by awarding points for neat handwriting and keeping the notebook fair.

Points in the scale of 1 to 5 were awarded to students based on their handwriting on their notebooks. Badges were decided to give to the students who scored the first three positions in each class. According to (Galessi, 2018) badges are simple virtual ribbons which illustrate a certain capability for users to do something. It is essential for users to feel they are important and skilled. Badges are awarded to students as they reach the goal by collecting a certain number of points in each session. Badges symbolize a reward given to the students for their achievements, which creates positive reinforcement in students' behaviour and drives them to take the initiative to gain the most out of the sessions.

Badges were designed by the art teacher of HIE for the first three positions with specifications of Gold for 1st prize, Silver for 2nd prize, and Bronze for the 3rd prize, as shown below in image 1. This was announced and shown in the school assembly.



IMAGE 1: BADGES FOR THE FIRST THREE POSITIONS

Gamification encourages learners to build intrinsic motivation, which enables them genuinely to enjoy the topics that they are learning (Gamification in Education, 2021). When the gamification concept is applied to education, it gives opportunities for learners to have experiential self-paced and lifelong learning, and it also engages learners with fun and rewards with knowledge and skills (Arnold, 2014). According to Denny (2013), students who have experienced strong preferences and joy towards the badge system as a game mechanism in gamification were evaluated individually and reported increased participation in the class. The role of gamification is to motivate students and is commonly used to affect their behaviour.

Apart from badges, the HIE school is also planned to award prizes for the first three positions in each class. First prize stainless steel water bottle, second prize Compass box and third prize Colour set kit. Before conducting the competition, we have been to each and every class and explained the handwriting competition rubrics to which the students have to pay attention while writing. Discussed what each rubric meant and showed by writing a few letters on the board. To

create excitement among students, we announced that at the end of the competition, the school will be awarding batches and prizes for the first three positions based on the points. To motivate students internally, explain the importance of hand writing in personality development. Good handwriting skills lead to stronger academic performance in reading and writing, boost self-confidence, and it is essential in all walks of life (Agarwal, 2020). It enabled students to understand the importance of handwriting and it will help them to score good marks in public or board exams of secondary education in India.

The results of the first round of the handwriting competition for primary school grades one to five are shown table 1 below. 160 students participated in the competition including those 92 boys and 68 girls. For each rubric, table 1 shows the number of students who gained their points on the nominal scale. To identify the category for each rubric in the handwriting competition for primary school, cumulative responses were calculated using the values in Table 1. The Median was calculated using the formula $n/2$; for boys the median value is 46 and for girls, the median value is 34. This was used to find the category in the cumulative responses, which falls in the Likert scale measures 1– Very Poor, 2 – Poor, 3 – Fair, 4 – Good, and 5 – Excellent. Below we show the results of the first round of the handwriting competition in primary school.

TABLE 1: ROUND 1 HANDWRITING COMPETITION FOR PRIMARY SCHOOL STUDENTS

| Round 1 Handwriting Competition for Primary Sections (Grades 1 to 5) of 160 students | | | | | | | | | | |
|--|----------------------------|-------|---------------------------------|-------|--|-------|-------------------|-------|--------------------------|-------|
| Rubrics | Good formation of a letter | | Space between Letters and words | | Letters are sized appropriately and consistently | | Spelling Mistakes | | Neatness (No scribbling) | |
| | Boys | Girls | Boys | Girls | Boys | Girls | Boys | Girls | Boys | Girls |
| Scale of 1 to 5 | | | | | | | | | | |
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2 | 3 | 3 | 1 | 3 | 2 | 2 | 1 | 2 | 3 | 2 |
| 3 | 51 | 32 | 25 | 11 | 48 | 25 | 32 | 15 | 21 | 11 |
| 4 | 35 | 22 | 45 | 36 | 34 | 27 | 41 | 31 | 48 | 32 |
| 5 | 3 | 11 | 21 | 18 | 8 | 14 | 18 | 20 | 20 | 23 |
| Total | 92 | 68 | 92 | 68 | 92 | 68 | 92 | 68 | 92 | 68 |

The primary school students' handwritten forms of letters and words show fairly and legibly. Especially girls maintained the size of letters and words consistently well throughout their writings in the notebook, whereas boys fairly maintained their letters and words. Both boys and girls were given good spaces between letters and words in all notebooks, but spelling mistakes were fairly managed by both of them. In view of the neatness of the handwriting and the notebook, maintenance was well managed by both of them. The results of the primary school reflect that the

formation of letters needs to improve, the size and consistency of letters should be maintained, and the spelling mistakes should be controlled.

TABLE 2: ROUND 1 HANDWRITING COMPETITION FOR MIDDLE SCHOOL STUDENTS

| Round 1 Handwriting Competition for Middle School (Grades 6 to 8) of 83 students | | | | | | | | | | |
|--|----------------------------|-------|---------------------------------|-------|--|-------|-------------------|-------|--------------------------|-------|
| Rubrics | Good formation of a letter | | Space between Letters and words | | Letters are sized appropriately and consistently | | Spelling Mistakes | | Neatness (No scribbling) | |
| Scale of 1 to 5 | Boys | Girls | Boys | Girls | Boys | Girls | Boys | Girls | Boys | Girls |
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3 | 33 | 9 | 17 | 8 | 25 | 9 | 16 | 7 | 12 | 4 |
| 4 | 19 | 11 | 15 | 6 | 26 | 11 | 19 | 4 | 33 | 12 |
| 5 | 6 | 5 | 26 | 11 | 7 | 5 | 23 | 14 | 13 | 9 |
| Total | 58 | 25 | 58 | 25 | 58 | 25 | 58 | 25 | 58 | 25 |

In middle school, 83 students participated in the competition – 58 boys and 25 girls. For each rubric, table 2 shows the number of students who gained their points on the nominal scale. To identify the category for each rubric in the handwriting competition, cumulative responses were calculated using table 2. The Median was calculated using the formula $n/2$ for boys which is $58/2 = 29$ and $(n+1)/2$ for girls which is $(25+1)/2 = 13$. This was used to find the category in the cumulative responses which falls in the Likert scale measures 1 – Very Poor, 2 – Poor, 3 – Fair, 4 – Good, and 5 – Excellent. Below we show the results of the first round of the handwriting competition in middle school.

By comparing with primary school, middle school students showed better performance. The results reflect that they followed by giving good space between letters and words. They maintained the size of letters appropriately throughout their writings and kept their notebooks in a good state. Boys' handwritten form of letters and words reflects fairly and legibly, whereas girls have well written their hand form of letters and words. Especially in the rubrics of correct spellings, again girls fall under the excellent category, whereas boys stay in the good category. In middle school, only handwritten forms of letters need to be improved.

While examining the primary students' handwriting on their notebooks, it was observed that the students were not knowing the basic pre-writing strokes like a vertical line, horizontal line, circle shape, cross shape, square shape, right or left diagonal line, x shape, and triangle shape. According to (Shaili, 2022) pre-writing strokes skills are the basic skills that children need to develop before they are ready to draw or write. These skills play a big role in building a strong foundation for nursery students to build their writing skills. In the first round of the handwriting

competition of primary school, it was identified that the students were not applying the pre-writing strokes on the handwritten letters b, d, f, h, i, j, k, l, p, q, t, v, w, x, y, z, and some of the students had challenges in forming curve shapes for the letters a, c, e, g, m, n, o, s, and u. The two years of the Covid 19 pandemic badly affected students' handwriting by staying at home; especially in primary school, students didn't get an opportunity to develop motor skills in handwriting.

Based on their handwriting, points were awarded, and given effective oral feedback for individual students based on their performance on the respective rubrics. Even the second author Miss. Naziya explained and demonstrated on the board the pre-writing strokes in each classroom to make them aware of their mistakes and asked them to improve in the second round of the handwriting competition. Instant feedback serves to reinforce knowledge by correcting mistakes, affirming competence, improving learners' confidence, and motivation to learn, and ultimately making learners' achievement (Markovic, 2023).

Apart from the feedback, the school took the initiative to introduce four ruled handwriting notebooks to improve students' handwriting based on the results of the round one competition in primary and middle sections. This was monitored and guided by the art teachers. In a week, every student will get two sessions to improve their handwriting. These sessions were well utilized by art teachers in teaching the formation of letters and words, giving enough space between letters and words, and maintaining the size of letters appropriately and consistently. Homework was also assigned to students so as to practice their handwriting at home. In addition, class teachers and subject teachers also insisted on students' writing in good handwriting and monitored their spelling during their class hours.

TABLE 3: ROUND 2 HANDWRITING COMPETITION FOR PRIMARY SCHOOL STUDENTS

| Round 2 Handwriting Competition for Primary School (Grades 1 to 5) of 160 students | | | | | | | | | | |
|--|----------------------------|-------|---------------------------------|-------|--|-------|-------------------|-------|--------------------------|-------|
| Rubrics | Good formation of a letter | | Space between Letters and words | | Letters are sized appropriately and consistently | | Spelling Mistakes | | Neatness (No scribbling) | |
| | Boys | Girls | Boys | Girls | Boys | Girls | Boys | Girls | Boys | Girls |
| Scale of 1 to 5 | | | | | | | | | | |
| 1 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 |
| 2 | 3 | 2 | 0 | 0 | 3 | 0 | 0 | 0 | 1 | 0 |
| 3 | 32 | 17 | 13 | 2 | 31 | 16 | 25 | 5 | 14 | 7 |
| 4 | 45 | 36 | 57 | 39 | 44 | 40 | 49 | 41 | 52 | 39 |
| 5 | 12 | 13 | 21 | 26 | 13 | 11 | 18 | 22 | 24 | 21 |
| Total | 92 | 68 | 92 | 68 | 92 | 68 | 92 | 68 | 92 | 68 |

The second round of the handwriting competition was conducted after two weeks, which enabled students to practice and improve their handwriting based on the feedback from round one. It was observed that students were very keen to show their notebooks for the second round

of the handwriting competition and they kept on asking when was the second round of the competition. The concept of gamification is the driving force for individuals to achieve their goals faster in effective ways (Coccoli et al., 2015). Some of the students were asking about the prizes for first, second and third positions in handwriting competitions. With every reward a student becomes more self-confident, proud, and also motivated to achieve another successful reward (Varthana, 2023).

In the second round of handwriting competition for primary school showed that the median value falls on the scale of 4 of good category for both girls and boys in all rubrics. The results reflect that the girls and boys of primary school showed good improvement in their handwriting by writing the correct form of letters and words, giving good space between letters and words, size of letters are maintained appropriately and consistently, writing correct spellings, and maintaining neat handwriting in all their notebooks. This enabled teachers to do their note book correction easily, but very few students had incomplete notes due to the absenteeism. The performance of the students also improved in summative assessment two as compared to summative assessment one. The action of using a hand to write the notes makes the brain retain that information a lot better and for a longer time (Commisso, 2021). In primary school, the study reflects that both boys and girls maintained equal performance in all the rubrics of the handwriting competition.

TABLE 4: ROUND 2 HANDWRITING COMPETITION FOR MIDDLE SCHOOL STUDENTS

| Round 2 Handwriting Competition of Middle School (Grades 6 to 8) for 83 students | | | | | | | | | | |
|--|----------------------------|-------|---------------------------------|-------|--|-------|--------------------|-------|--------------------------|-------|
| Rubrics | Good formation of a letter | | Space between Letters and words | | Letters are sized appropriately and consistently | | Spellings Mistakes | | Neatness (no scribbling) | |
| | Boys | Girls | Boys | Girls | Boys | Girls | Boys | Girls | Boys | Girls |
| Scale of 1 to 5 | | | | | | | | | | |
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3 | 18 | 3 | 4 | 0 | 12 | 0 | 5 | 0 | 6 | 0 |
| 4 | 39 | 12 | 48 | 10 | 42 | 14 | 39 | 5 | 39 | 12 |
| 5 | 1 | 10 | 6 | 15 | 4 | 11 | 14 | 20 | 13 | 13 |
| Total | 58 | 25 | 58 | 25 | 58 | 25 | 58 | 25 | 58 | 25 |

By comparing with the round 1 middle school handwriting competition, students showed improvements in round 2. The median value falls on the scale of 4 of the good category, and 5 of the excellent category on different rubrics of the competition. In the first rubric good formation of letters, boys showed improvement by moving from the fair to the good category, whereas girls maintained in the good category. In the second rubric space between letters and words, boys maintain in the good category, whereas girls showed improvement by moving from the good category to the excellent category. In the third rubric letters were sized appropriately and

consistently, whereas both girls and boys maintained in the good category. In the fourth rubric spelling mistakes, whereas both boys and girls maintained in the same categories – good and excellent categories. In the fifth rubric neatness, boys maintained in the good category, whereas girls showed improvement by moving from the good category to the excellent category.

In middle school, the study of handwriting reflects that girls are one step ahead of boys by maintaining good space between letters and words, keeping their notebooks neat and tidy, and writing the spellings of the words correctly. Handwriting plays a vital role in cognitive development, it helps us to use different brain areas for different functions like boosting creativity, improving memory, relieving depression, calming stress and anxiety, and enhancing focus (Commisso, 2021). It was observed that students started comparing their handwriting and they focused more on improving it, at the same time they were also slow in copying the notes from the board. This was informed to teachers to give enough time for students to write down their notes.

In primary school the total number of students was 160 in that 35 per cent of students scored above 80 per cent of points in round one of the handwriting competitions. In the second round of the competition, 61 per cent of students scored above 80 per cent of points, whereas 26 per cent of students showed improvement in their handwriting. In Middle school, the total number of students was 83 in that 48 of the students scored above 80 per cent of points in round one of the handwriting competitions. In the second round of the competition, 75 per cent of students scored above 80 per cent of points, whereas 27 per cent of students showed improvement in their handwriting. This reflects that the students got good practice to improve their handwriting using four ruled notebooks and it was well monitored by the art teachers.

Prizes were awarded to students in the school assembly, who got first, second and third positions in each class. Some of the positions had two to three students have the same points. A total of 50 students were awarded prizes and badges, who got the best handwriting at the Hyderabad Institute of Excellence. Students who won the badges were allowed to wear them on the school premises for a week to motivate other students to improve their handwriting. Out of 240 students, 20 per cent of students got the best handwriting at the Hyderabad Institute of Excellence. Overall, 53 per cent of students showed improvement in their handwriting.

CONCLUSION

Handwriting plays a very important role in students' life. The school, the Hyderabad Institute of Excellence, took the initiative to improve students' handwriting by conducting two rounds of handwriting competitions by including gamification concepts. This enabled students to maximize their enjoyment and engaged them by capturing their interest and inspiring them to continue in good handwriting. Game elements points, badges, and prizes motivated students throughout the competition. Constructive feedback helped them to improve their handwriting. The result shows that out of 240 students, 20 per cent of students got the best handwriting at the Hyderabad Institute of Excellence. Overall, 53 per cent of students showed improvement in their handwriting and they are able to spell the words correctly. Such competitions have to be continued every academic year to retain the good handwriting of students.

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