i-SPiKE 2023

INTERNATIONAL EXHIBITION & SYMPOSIUM ON PRODUCTIVITY, INNOVATION, KNOWLEDGE & EDUCATION

"Optimizing Innovation in Knowledge, Education and Design"

EXTENDED ABSTRACT

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CATEGORY: CSP YOUNG INVENTOR

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Assalamualaikum warahmatullahi wabarakatuh,

First and foremost, I would like to express my gratitude to the organizing committee of i-Spike 2023 for their tremendous efforts in bringing this online competition a reality . I must extend my congratulations to the committee for successfully delivering on their promise to make i-Spike 2023 a meaningful event for academics worldwide.

The theme for this event, 'Optimizing Innovation in Knowledge, Education, and Design,' is both timely and highly relevant in today's world, especially at the tertiary level. Innovation plays a central role in our daily lives, offering new solutions for products, processes, and services By adopting a strategic approach to 'Optimizing Innovation in Knowledge, Education, and Design,' we have the potential to enhance support for learners and educators, while also expanding opportunities for learner engagement, interactivity, and access to education.

I am awed by the magnitude and multitude of participants in this competition. I am also confident that all the innovations presented have provided valuable insights into the significance of innovative and advanced teaching materials in promoting sustainable development for the betterment of teaching and learning. Hopefully, this will mark the beginning of a long series of i-Spike events in the future.

It is also my hope that you find i-Spike 2023 to be an excellent platform for learning, sharing, and collaboration. Once again, I want to thank all the committee members of i-Spike 2023 for their hard work in making this event a reality I would also like to extend my congratulations to all the winners, and I hope that each of you will successfully achieve your intended goals through your participation in this competition.

Professor Dr. Roshima Haji Said
RECTOR
UiTM KEDAH BRANCH

WELCOME MESSAGE (i-SPiKE 2023 CHAIR)

We are looking forward to welcoming you to the 3rd International Exhibition & Symposium on Productivity, Innovation, Knowledge, and Education 2023 (i-SPiKE 2023). Your presence here is a clear, crystal-clear testimony to the importance you place on the research and innovation arena. The theme of this year's Innovation is "*Optimizing Innovation in Knowledge, Education, & Design*". We believe that the presentations by the distinguished innovators will contribute immensely to a deeper understanding of the current issues in relation to the theme.

i-SPiKE 2023 offers a platform for nurturing the next generation of innovators and fostering cutting-edge innovations at the crossroads of collaboration, creativity, and enthusiasm. We enthusiastically welcome junior and young inventors from schools and universities, as well as local and foreign academicians and industry professionals, to showcase their innovative products and engage in knowledge sharing. All submissions have been rigorously evaluated by expert juries comprising professionals from both industry and academia.

On behalf of the conference organisers, I would like to extend our sincere thanks for your participation, and we hope you enjoy the event. A special note of appreciation goes out to all the committee members of i-SPiKE 2023; your dedication and hard work are greatly appreciated.

Dr. Junaida Ismail
Chair
3rdInternational Exhibition & Symposium Productivity, Innovation, Knowledge, and Education 2023 (i-SPiKE 2023)

"IMAGINE SPACING RULER, YOUR WRITING BUDDY"

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ABSTRACT
This paper will discuss the spacing ruler, an invention seeking a solution for handwriting in kids. This idea is meant to solve the issue of inadequate educational resources for children's writing, especially those with hand-coordination problems. Lack of a tool to support kindergarten and primary school kids' excitement in writing resulted in a lack of confidence in their writing abilities. Uneven spacing and sloppy handwriting have long been common issues in classrooms. Extensive research has been done to address this issue, leading to the creation of a special featurefor a regular ruler—the adjustable or movable spacer. The study brought members' attention to how challenging the writing journey is for kids with motor-coordination problems to estimate measurements on a piece of paper due to poor visual motor and perceptual skills. By emphasizing the equipment and teaching materials, the invention of the spacing ruler is in line with the Malaysian Persons with Disabilities Act 2008, which emphasizes

PWDs equal access to education. After a series of demonstrations, it can support not merely Special Educational Needs (SEN) learners but also junior writers in exploring their writing experience.

Keywords: writing, writing aid, young writers, spacing ruler, special educational needs

INTRODUCTION: INVENTION OF SPACING RULER

The spacing ruler is an invention to support existing academic tools developed for kids to enjoy their writing journey. The main idea of this invention is to exhibit an alternative way for junior writers to write with less stress by moving the built-in spacer word by word or phrase by sentence to modify the spacing size to their preferences rather than relying on their fingers, which can vary in size depending on the user. Despite the challenges they may face, which are explained further in the next section, this idea may contribute to the promotion and development of the quality of life and well-being of persons with disabilities as a whole and access to education.

As depicted in the Malaysian Persons with Disabilities Act 2008, which emphasized PWDs involvement in school without discrimination. The spacing ruler was invented to help parents, teachers, or facilitators inject positive awareness into the issues, challenges, and barriers faced by both young writers and disabled children by emphasizing the supportive learning method. Spacing rulers display the characteristics of simple yet meaningful tools that create valuable experiences and indirectly boost motivation and the joyful journey of young to mature writers.

WHY SPACING RULER?

Discussion on the importance of handwriting skills and their contribution to learning has been broadly discussed by many. From the child development perspective, writing is a fundamental skill in the early stages of educational activities (Tosetto et al., 2020) which comprises 30%–60% of activities in schools for children (K McHale & S A Cermak, 1992)). However, regardless of its importance, it is reported that some children may experience challenges and difficulties in acquiring these vital skills, especially kids with motor coordination issues (B.C.M. Smits- Engelsman et al., 2001; Bouwin C M Smits-Engelsman et al., 2012)

To revisit empirical studies on handwriting difficulties in primary school children, it is worth noting the dynamic contribution of perceptual motor function (Volman MJ et al., 2006) , fine motor skills (Mahfuzah Zainol et al., 2022) , visual motor integration (Duiser Ivon et al., 2020; Marie Brossard-Racine et al., 2012), cognitive function, and speed of handwriting (Volman Chiel et al., n.d.; Volman MJ et al., 2006) in children's academic and school-related tasks (Maëlle Biotteau et al., 2019).

Few studies regarding the contribution of motor skills and processes to writing skills found that almost 5% to 35% of junior writers globally face challenges with their handwriting (Duiser Ivon et al., 2020; Jane Medwell & David Wray, 2007). These statistics depicted the urgency of intervention, provided that handwriting difficulties have a strong relationship with poor academic achievement (Anneloes Overvelde & Wouter Hulstijn, 2011; Lisa Michele Barnett

et al., 2009; M J M Volman et al., 2006; Maëlle Biotteau et al., 2019b; Weintraub Naomi, 2004), lower self-esteem (Marie Brossard Racine et al., 2008) ; lower self-motivation (Mahfuzah Zainol et al., 2022 ; Berninger & Wolf, 2018) and minimized chances of life skills development (Steve Graham & Karen R. Harris, 2005).

HOW SPACING RULER INVENTED?

The revolutionary spacing ruler has been tested, displayed, and pitched in a variety of educational settings, including kindergartens and primary schools. Due to its inventive design and creativity, it has won several prestigious honors for participating in various events and exhibitions later discussed in item 6. As depicted in Table 1 below, the invention of spacing rulers began in 2019 and continued until 2023. Product development was carried out from time to time for the invention to stay current and satisfy the constantly shifting needs of young writers. Inventors constantly work to innovate and produce goods that genuinely resonate with their target market, whether through improvements in features, design enhancements, or improved functionality.

Table 1. Invention of Spacing Ruler

Invention	Year	Material	Cost	Features	Image
SR 1.0	2018	Acrylic Plastic (Plexiglass)	RM25.00	ï Lighter in weight ï Design suits pre and primary school kids ï Vibrant colors ï Playful design ï 15 cm length ensures compatibility ï Standard school notebooks and writing supplie ï Easy to carry ï Easy to crack	
SR 2.0	2019	Acrylic Plastic (Plexiglass)	RM20.00	ï Design suits pre and primary school kids ï Vibrant colors ï Playful design ï 20 cm length ensures compatibility ï Standard school notebooks and writing supplies ï Easy to carry ï Multifunctional design with sharpener and pencil holder	

SR 3.0	2023	Aluminium Composite Panel	RM15-RM17	ï Durablee ï Solid ï Positive ï Environmental Impact ï Using Recycle Item ï Wider writing area ï Smooth spacer transition ï Lighter in weight ï Universal Design	

The invention of the spacing ruler has been developed thoroughly to address the needs and challenges faced by young writers as well as SEN learners in Malaysia. The invention development consists of four phases i.e., 1) needs assessment and design, 2) invention validation and 3) demonstration of the model 4) Design modification

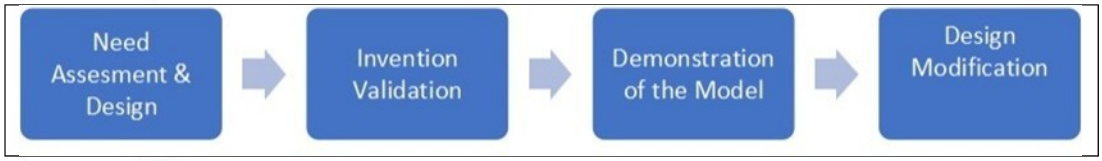

Figure 1. The Development Phase of Spacing Ruler

In summary, the development of the spacing ruler 1.0 to 3.0 followed a systematic approach, from needs assessment and initial design through validation, practical demonstration, and ongoing design improvements. This approach ensured that the invention effectively addressed the unique needs of its target audience, ultimately enhancing the writing experience for young writers and SEN learners in Malaysia.

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