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ASTRONOMY FOR TEACHERS: A SOUTH AFRICAN PERSPECTIVE

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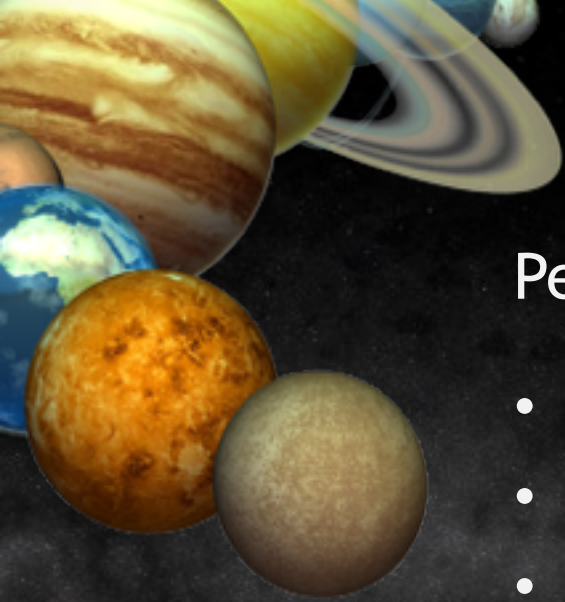


INTRODUCTION

South Africa has nominated Astronomy as a “flagship science” and aims to be an international Astronomy hub through projects such as Very Long Baseline Interferometry (VLBI - HartRAO), the Square Kilometre Array (SKA) and the South African Large Telescope (SALT).

Astronomy offers a door for learners to enter into careers in science and technology - fully supported by government.





Performance on:

- Annual National Assessment (ANA)
- International M&S Survey (TIMSS)
- Global Competitiveness Report (GCR)

Focus on **Maths and Science**



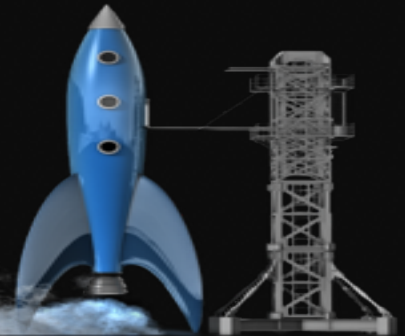


BACKGROUND

Curriculum and Assessment Policy Statement (CAPS) - every subject have own CAPS document

Knowledge strands are used as tools for organising the content of a specific subject

“Planet Earth and Beyond” forms part of the subject Natural Sciences



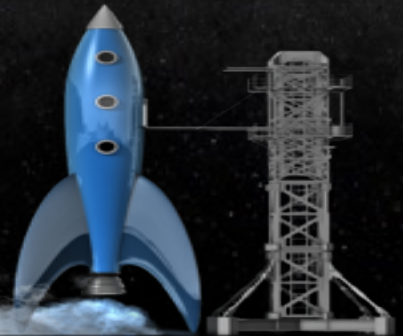
SA SCHOOL CURRICULUM - CAPS

Intermediate phase Grades 4 - 6	NATURAL SCIENCES AND TECHNOLOGY Knowledge Strands	
	Life and Living Matter and Materials Energy and Change	Earth and Beyond Technology Structures Mechanical and Electrical systems and control
Senior phase Grades 7 - 9	NATURAL SCIENCES Knowledge Strands	
	Life and Living Matter and Materials	Energy and Change Planet Earth and Beyond

Most teachers that specialised in Natural Sciences, never covered Astronomy in their training. Astronomy used to be part of Geography.

RESEARCHERS

- Hartebeesthoek Radio Astronomy Observatory (HartRAO)
- University of South Africa (UNISA)





AIM OF RESEARCH

- to assist teachers to gain more knowledge and skills to teach the strand “Planet Earth and Beyond” with confidence
- to promote a science culture among teachers and learners
- to improve learners’ performance on the Timms and ANA, by using the strand “Planet Earth and Beyond” as a driver
- inspiring learners (female) and attracting them into the study of Natural Sciences



RESEARCH QUESTION

To what extent do teachers have enough content and pedagogical knowledge to teach “Planet Earth and Beyond” ?

Sub-questions :

- do teachers have curriculum aligned resources ?
- do teachers have interactive resources for demonstration purposes ?
- do teachers have the necessary knowledge and skills to use the resources ?


RESEARCH METHOD

- Literature review
- Quantitative design

LITERATURE REVIEW

- “Planet Earth and Beyond” is very detailed and difficult for teachers without full knowledge and understanding to teach
- Projects are complicated for learners and can pose challenges especially for under resourced schools
- Teachers not trained to teach Astronomy



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- “Planet Earth and Beyond” strand is generally regarded as the worst taught and most avoided Natural Sciences knowledge strand
 - Some teachers lack content and pedagogical knowledge in Astronomy
 - Some schools do not have resources or teachers do not know how to use the resources

Focus on Teachers

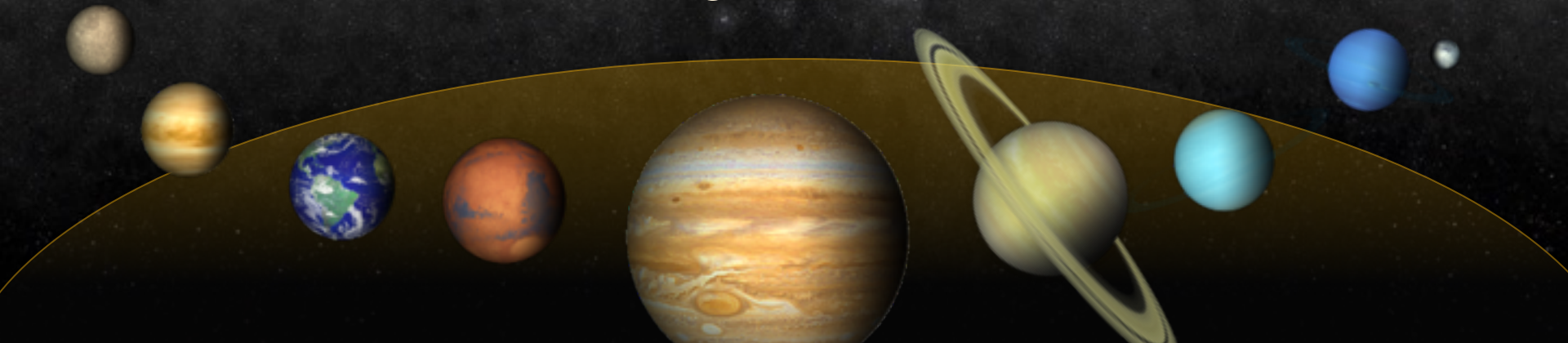


QUANTITATIVE METHOD

Investigate the needs of Natural Science teachers

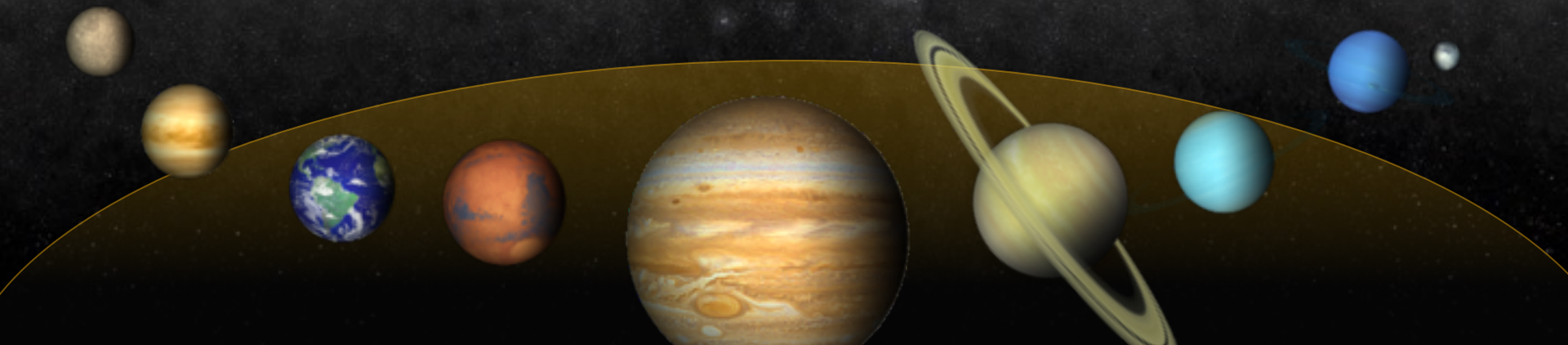
Questionnaire 3 section

- Section A: Biographical information
- Section B: Teaching - statements on 6 point likert scale
- Section C: Knowledge - statements - True/False





- Stratified sampling method was used
- Sample size 200 primary schools in Gauteng
- All grade 4-7 teachers teaching Natural Sciences (700)

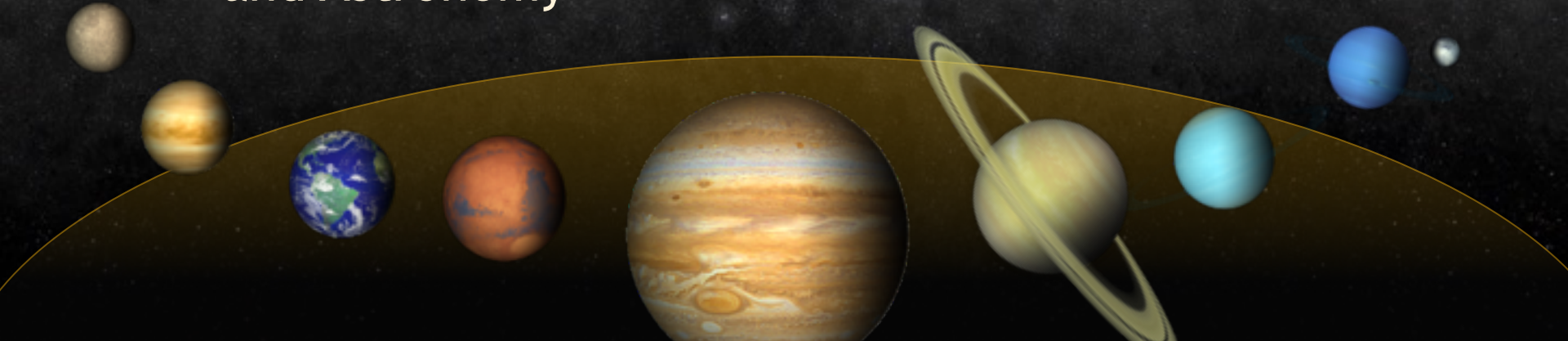


A small, stylized rocket ship that is a yellow pencil with a blue body and a white eraser, with a white plume of smoke coming out of the bottom.

Questionnaire: pilot study completed

- Twenty schools (60 teachers) in Gauteng
- Raw data available

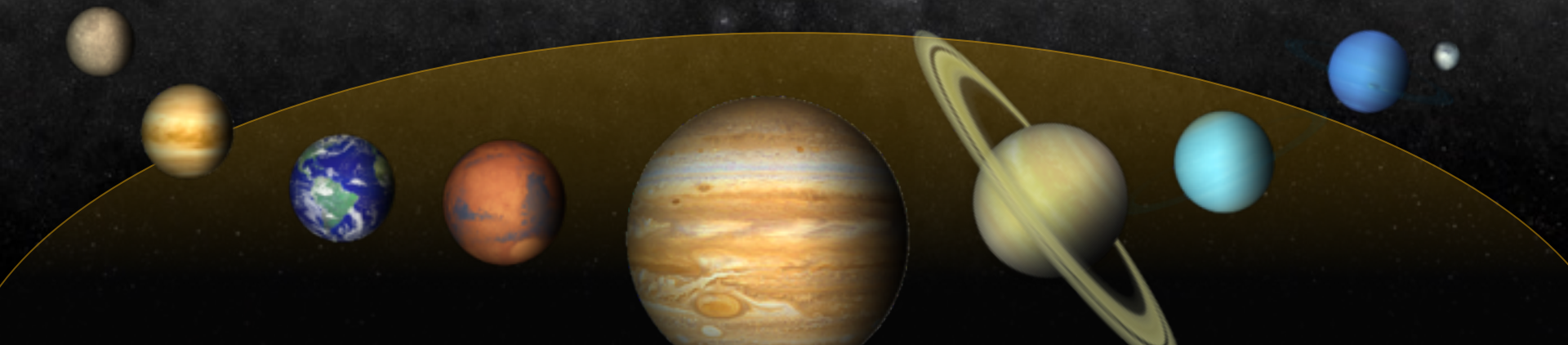
Teachers not trained to teach Natural Sciences
and Astronomy



A blue and white pencil-shaped rocket with a yellow eraser tip and a grey smoke trail, flying upwards and to the right.

OUTCOMES OF RESEARCH

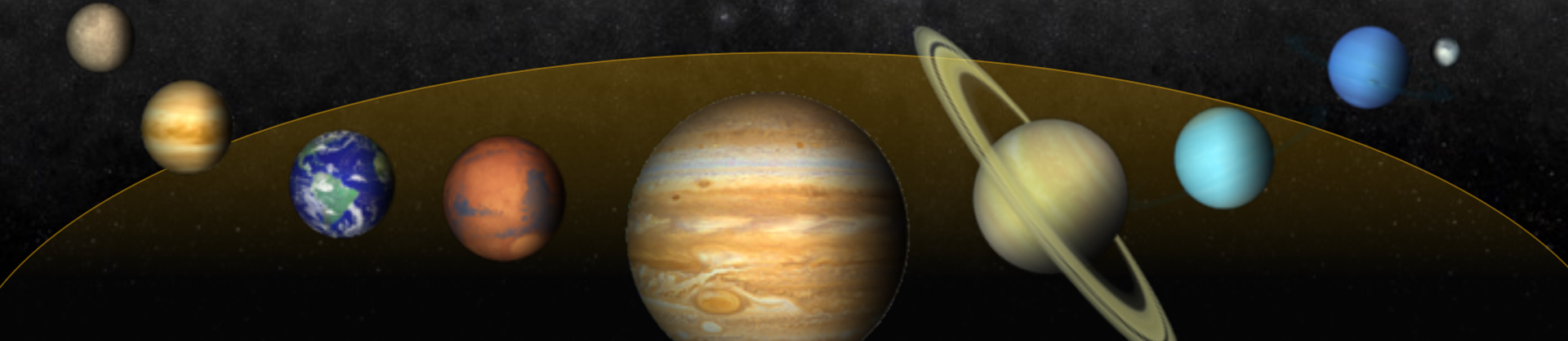
- Publish articles (accredited journals)
- Design workshop material
- Design a short learning programme



A small, stylized rocket ship with a blue body and yellow nose cone, emitting a white plume of smoke, is positioned in the upper left corner of the slide.

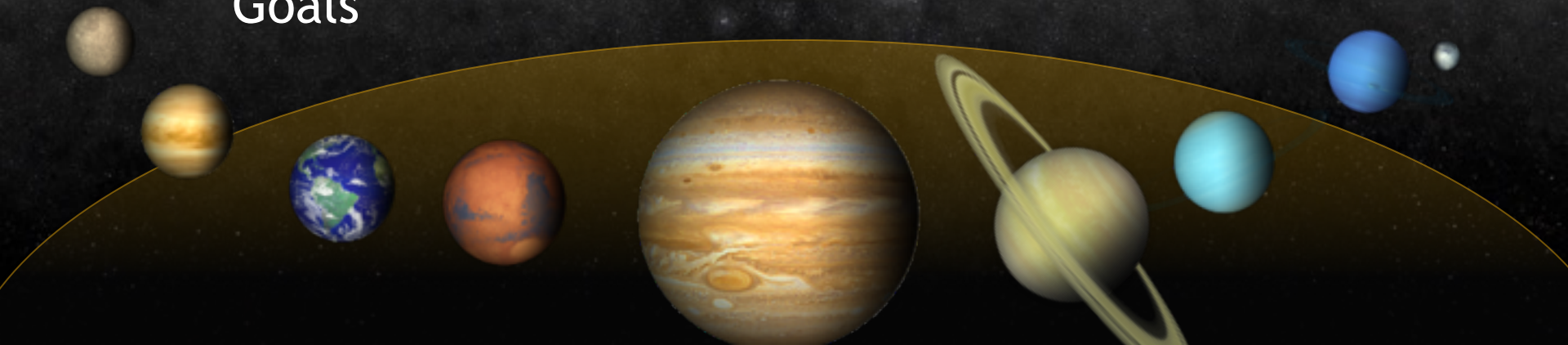
Workshop material

- The 21st century learner
- How to balance content knowledge and pedagogical knowledge with technology
- Curriculum aligned resources and interactive resources for demonstration purposes



CONCLUSION

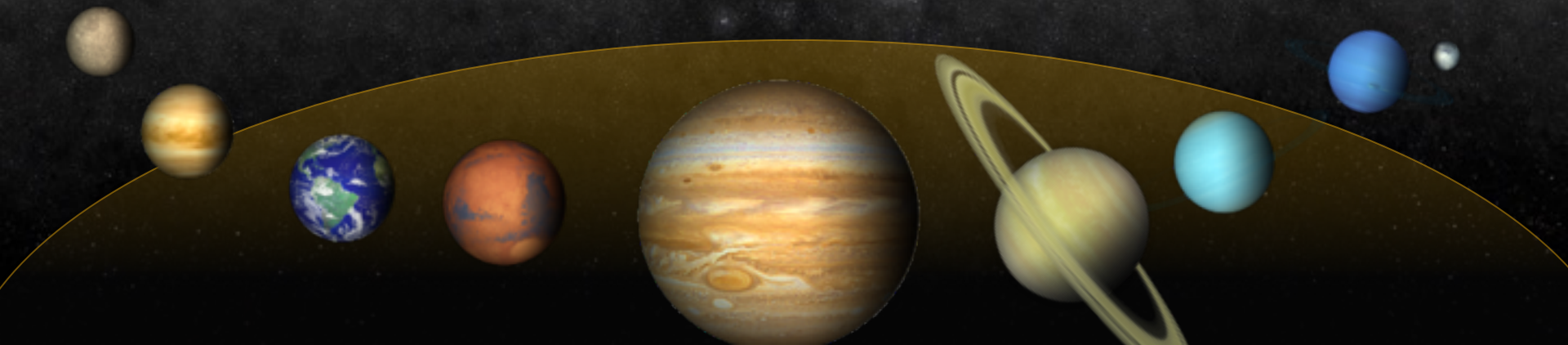
- Teachers will gain more knowledge and skills to teach the strand “Planet Earth and Beyond” with confidence
- Promote a science culture among teachers and learners
- Contribute positively to the Millennium Development Goals



CONCLUSION

Design a short learning programme in

Astronomy for Teachers



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THANK YOU