

Tourism Myths and the Dunning Kruger Effect

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This is the accepted version of Pratt, S., Pan, B., Agyeiwaah, E., Lei, S. S. I., Lugosi, P., Kirillova, K., ... & Park, S. (2024). Tourism myths and the Dunning Kruger effect. *Annals of Tourism Research*, 104, 103620. <https://doi.org/10.1016/j.annals.2023.103620>

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Abstract

There are many erroneous but pervasive ‘truths’ about tourism. This study assesses individuals’ capacity to question these myths alongside their self-perceptions of their critical thinking skills. The research used a survey with 1,493 respondents from 22 universities across 16 countries/territories to test the Dunning Kruger effect, which suggests an inverse relationship between self-belief and competence. The data provides strong evidence of the Dunning Kruger effect insofar as those more likely to believe in tourism myths also had a greater tendency to overestimate their capabilities, and vice versa. We discuss the possible causes and the implications for tourism education, identifying potential interventions at different points along learners’ developmental journeys to help ensure a more sustainable future for tourism scholarship and practice.

Keywords: Competence; Dunning Kruger Effect; Metacognition; Self-assessment; Tourism Myths

“Real knowledge is to know the extent of one's ignorance.” Confucius

“The more I learn, the more I realize how much I don't know.” Albert Einstein

Introduction

Despite decades of research into the phenomenon of tourism, there is still much debate about commonly held 'truths', if indeed there are any 'truths' (Tribe, 2006a). Many commonly held 'truths' of tourism are actually myths – statements that are long-standing and underpinned by widely-held beliefs but false (McKercher & Prideaux, 2014). These 'truths' have been repeated so many times that they have become platitudes, frequently recited by students and academics alike. How are these myths about tourism generated? McKercher and Prideaux (2014) review myth-making in academia more generally and examine the genesis of some of the myths about tourism from early research. Butler (2015) and Wassler and Fan (2021) chronicle the evolution of tourism and its study, tracing where much of the 'knowledge' about tourism originated. Butler (2015) notes different eras of tourism scholarship, characterised by factual case studies to superficial theoretical development to the current period of paradoxes and fallacies, hinting at the myths being perpetuated.

The debate and criticism on the *raison d'être* and development of tourism knowledge have incited academics to question the health and sustainability of the tourism academy and industry practice (Tribe, 2006a). Tourism curricula, which were designed largely based upon the existing body of knowledge, have thus been challenged in terms of their representativeness of the tourism phenomenon (Lehto et al, 2022). As the future of tourism knowledge development relies on the next generations of students, especially post-graduates (Filep et al., 2015; Lee & Benjamin, 2023), investigating how students understand and perceive tourism knowledge is necessary to inform curriculum design and how our next generations should be taught. While this topic has been understudied, an assumption is that students who embrace the tourism myths are more likely to hold stronger views that these myths are true, which may hinder their ability to rethink the possibilities of a fundamental shift in the way tourism operates. Thinking broadly, holding such beliefs unquestioned can also undermine the potential of the tourism academy to engage in “disruptive” research. Although the number of papers continue to increase, their quality in terms of being able to provide an insight or a real impact is declining (McKercher & Dolnicar, 2022; Lee & Benjamin, 2023). Such a dire state of tourism scholarship reflects a similar issue in hard sciences and technology research (Kozlov, 2023). Driving the point home, students with poorer critical thinking abilities may be more likely to believe these tourism myths but also be less likely to question these myths and recognize their own lack of critical thinking. This is the phenomenon known as the Dunning Kruger Effect.

The Dunning Kruger Effect purports that individuals who perform poorly at a task or lack knowledge or skills in an area are less likely to realize they are underperforming (Kruger & Dunning, 1999). They overestimate their ability. Dunning et al. (2003) referred to this as a double curse: the skills and knowledge needed to provide stronger and better informed responses are the same skills and knowledge needed to recognize the validity of the individual's responses. So, when people lack the skills to come up with “correct” answers, they also cannot discern when their answers are right or wrong.

The main purposes of this study are to investigate the prevalence of commonly-held tourism myths among tourism students worldwide, and to validate the Dunning Kruger Effect among these students. Thus, the objectives of this research are threefold. The first objective is to test empirically the extent to which tourism and hospitality students believe in common tourism myths. The second objective is to assess the strength of their convictions regarding the myths. Achieving those two research objectives will determine to what extent tourism and hospitality students hold to the Dunning Kruger Effect. The third objective is to understand how these tourism myths are associated with other cognitive heuristic biases. We consider whether students who believe in other scientific myths more likely to believe in tourism myths, questioning whether beliefs in tourism myths are restricted to this domain, as a result of tourism and hospitality education.

Literature Review

Academic myths are widely-held, long-standing beliefs that might not be true nor have stood up to deep and rigorous inspection (McGee, 1985). As McKercher and Prideaux (2014) articulated, academic myths are commonplace across many academic disciplines, from natural to social sciences. Academic myths exist due to many reasons. Conceptions emerging from early research in a field can become embedded, remaining the dominant stream of thought even when confronted by contradictory evidence (Mercer, 2006). Flawed methods also contributed to many myths that might be replicated in future studies and perpetuated (McKercher & Prideaux, 2014). Due to their self-interests, certain stakeholders, such as companies who willingly believe the legitimacy of their behaviour (Doane, 2005), further contribute to the perpetuation of widespread academic myths.

McKercher and Prideaux (2014) surveyed tourism researchers and derived six types of myths prevalent in tourism academia. These include Self Interest ("*Tourism is an industry*"), Negative Foundation ("*Tourism destroys tourism*"), Reactive Positive Stakeholder ("*Tourism revitalizes culture*"), Convergent ("*Small is preferable*"), Too Good to be True ("*Special interest tourism is the mainstream*"), and Inherited ("*Carrying capacity works in tourism*"). These tourism myths have emerged from decades of tourism research and perpetuated by multiple generations of tourism scholars.

The emergence of tourism “myths” could be associated with the complexities in defining tourism knowledge and problems of the system through which tourism knowledge is assembled. It has been difficult to define what “truth” actually means in tourism, and whether tourism is a “discipline” has been a long-standing debate. Stating that studies in this field are still in a pre-paradigmatic stage, Tribe (2006a) questions whether it is possible to tell the truth about tourism, and stated that “despite many truths being established, the whole truth about tourism is left untold resulting in gaps, silences and misconstructions” (p.360). He argues that while the tourism phenomenon is comprised of a wide range of issues, the process of knowledge creation (i.e., tourism research) is constrained by a number of factors such as research interests, ideologies, culture, and time.

The complexity of tourism and those unresolved issues of knowledge creation reinforces the importance of students’ critical thinking i.e. their general ability to assess the value and veracity of evidence, of disparate perspectives and of emerging assumptions. Students should be aware of

the many gaps in tourism research and be encouraged to embrace innovative approaches to discover new aspects of tourism (Tribe, 2006b). However, curricula design and how tourism knowledge is taught varies among lecturers and institutions. Tourism curriculum design may further be complicated by influences of decision makers and institution policies. For example, students may have fewer opportunities to learn tourism theories if their institutions emphasize vocational training (Tribe, 2006b). While post-graduate students are the future knowledge makers, problems related to publication pressure and predatory journals have made scholars question whether quality tourism research has been produced to advance tourism knowledge in impactful ways (Lee & Benjamin, 2023; McKercher & Dolnicar, 2022). These problematic issues make it necessary to investigate students' understanding of tourism knowledge and their ability to criticize existing knowledge.

However, these academic myths may not be all 'bad'. They might be innocuous and can serve as a rallying point for forming an academy identity for a field of study (McKercher & Prideaux, 2014), such as those myths belonging to the Self Interest category. However, many other commonly-held tourism myths will have detrimental effects on society. For example, a blind belief in the value of a niche tourism market, a myth of "*special interest tourism is mainstream*", may lead to wasted tourism marketing and development effort. Due to the possible negative impact of these myths, to what degree these are held amongst tourism students is a question that needs to be addressed, especially for those burgeoning students who are becoming future leaders in academia and professionals in the industry.

Individual differences exist in the degree to which one believes in tourism myths. A tourism student with extensive experience and critical thinking skills may adopt a more objective view and question these tourism myths. Further, responses and strength of belief in tourism myths may vary by country, culture, and age, as well as stage in educational career. However, according to the Dunning Kruger Effect (Kruger & Dunning, 1999), the individuals who lack skill or knowledge, overestimate their skill and ability, and struggle to recognize when their knowledge and expertise have reached their limits. The Dunning Kruger Effect has been observed in a wide range of contexts and cognitive areas: from university debate teams' performances, gun club members' knowledge of firearms (Ehrlinger et al., 2008), to Americans' political knowledge (Anson, 2018), sports coaches' strategy and teaching ability (Sullivan et al., 2019), training of police officers (Kristjánsson, 2022), teaching macroeconomics students (Sawler, 2021) and individuals' self-assessment of racism and sexism (West & Eaton, 2019). In general, people who are less competent or skilled tend to overestimate their talent and ability (Dunning et al., 2003).

Kruger and Dunning's original studies tested the effect across four scenarios by showing that those who performed poorly had an exaggerated view of their performance (self-efficacy) across a range of social and intellectual domains. These lower-performing participants were also less likely to recognize competence or expertise in others (Kruger & Dunning, 1999). Kruger and Dunning (1999) attribute this to a lack of metacognitive, metamemory, metacomprehension, and self-monitoring skills among less-skilled individuals (Folk, 2016). They stress that people are unable to assess their degree of ability objectively due to a lack of self-awareness. Conversely, Kruger and Dunning's (1999) study showed that high-performing participants are inclined to underestimate their competence.

Surprisingly, there is little research into whether the Dunning Kruger Effect is present in the tourism and hospitality domain. Recent research by Koc (Boz & Koc, 2019; Koc, 2021) has

started to examine this issue among hospitality employees. Boz and Koc (2019) designed a task where hospitality employees were asked to identify the correct emotions/facial expressions from a photo. They were also asked to rate their ability to perform such task. Confirming evidence of the Dunning Kruger Effect, a significant percentage of hospitality employees had difficulty recognizing emotions/facial expressions yet overestimated their ability to distinguish these emotions/facial expressions. Koc (2021) explored the issue of tourism and hospitality employees' intercultural competence and revealed evidence of the Dunning Kruger Effect, whereby employees inflated their intercultural awareness and competence in addition to having extremely low intercultural competency. The results suggest that the self-efficacy beliefs of the employees were relatively high, which in turn may have caused overconfidence as well as a lack of awareness of basic intercultural competencies. Interestingly, participants with formal tourism and hospitality education underperformed compared to the rest of the group and overestimated their own intercultural awareness. Findings show that the exaggeration of one's own skills and competencies lead to inflated self-efficacy.

In sum, given the prevalence of myths concerning tourism, and the risks associated with their perpetuation, it is important to evaluate students' capacity to engage with them. Past research in alternative empirical settings has shown that the Dunning Kruger Effect is an effective way to conceptualize and evaluate people's self-conceptions against their actual abilities to deal with complexity and ambiguity. However, its application to tourism scholarship or education has been very limited, which represents significant gaps in our current understanding. Consequently, this study contributes to our understanding of students' capacity to engage with the myths surrounding tourism, drawing on the Dunning Kruger Effect to assess students' potential to understand and to challenge them.

Methods

Survey Design

Given the need to empirically test the belief or the academic myths of tourism proposed by McKercher and Prideaux (2014), the research team developed a quantitative questionnaire hosted on an online survey platform, which can be found in the Supplemental Materials. While we were interested in students' critical thinking about tourism myths, we also included non-tourism logic questions to assess if critical thinking in the tourism domain differed from general logical thinking.

After asking the students for their consent to participate in the survey, the first section included three questions from Frederick's (2005) Cognitive Reflection Test. Rather than an IQ test, the Cognitive Reflection Test assesses the propensity to respond incorrectly based on heuristics rather than reflecting more deeply and responding correctly (Toplak et al., 2011). Respondents often get these questions wrong because they provide an incorrect intuitive response, but with a moment's reflection, the correct answer is easily understood when explained. This set of questions has been used widely in the heuristics-and-biases literature to investigate how people engage in autonomous/intuitive (Type 1) thinking. Type 1 thinking occurs spontaneously and does not demand a lot of mental energy. In contrast, others follow more deliberative/analytic (Type 2) processes (Pennycook et al., 2017), which call for effort, concentration, and the application of learned rules (Kahneman, 2011; Thompson et al., 2011). These dual-process

theories have received significant attention in recent years as scholars attempted to understand decision-making processes (Evans & Stanovich, 2013; Kahneman, 2011; Thompson et al., 2011).

The seminal work by Frederick (2005) revealed that the Cognitive Reflection Test is correlated, but only moderately, with more traditional tests of academic achievement such as the Scholastic Achievement Test ($r=0.44$) and the American College Test ($r=0.46$) (Frederick, 2005). Toplak et al. (2011) show that a more effective predictor of success on a large sample of tasks from the heuristics and biases literature is the Cognitive Reflection Test.

Thomson and Oppenheimer (2016) critiqued the Cognitive Reflection Test, arguing that, among other things, it has been overused, and many potential respondents have been exposed to the solutions. The original Cognitive Reflection Test relies heavily on numeracy skills, so many are unable to test cognitive reflection. They developed a second set of 'brain teasers', which they termed Cognitive Reflection Test-2. We included those four questions from Cognitive Reflection Test-2. Regardless of individuals' cognitive ability, often, they do not think critically enough to see their errors. We included these sets of questions in Cognitive Reflection Test/Cognitive Reflection Test-2 to assess the association between heuristic thinking as measured by these questions and the belief in tourism myths.

McKercher and Prideaux (2014) identified 30 tourism myths under six broad categories. The second section of the survey instrument asked respondents whether they agree with the statements (myths), with the possible responses being 'Agree', 'Disagree', or 'It depends'. Both 'Agree' and 'Disagree' are considered less accurate responses. 'It depends' is the most accurate response and demonstrates critical thinking. Following the assessment of these myths, participants were asked to estimate how many questions they thought they had successfully answered. They were then asked to estimate the number of questions that their peers would, on average, answer correctly. We also asked participants to compare themselves with 100 of their peers and asked them to rank themselves against this peer group in terms of performance on these statements about tourism. Specifically, participants were asked to estimate what their rank would be from 1 ("My score would be at the very bottom, worse than the other 99 people") to 100 ("My score would be at the very top, better than the other 99 people") (Dunning et al., 2003; Ehrlinger et al., 2008).

Next, we assessed students' beliefs in commonly held science myths. Swami et al. (2012) developed a Belief in Science-Related Myths scale based on urban legends found on a popular fact-checking website, www.snopes.com. An example of these urban legends is that 'we use only 10% of our brains'. However, peer-reviewed academic literature has found all these claims to be false (Vreeman & Carroll, 2007 and the literature cited therein). Rather than asking participants to rate each statement on a 7-point Likert-type scale, where 1 is 'totally unbelievable,' and 7 is 'totally believable', as in the original paper, given that the myths are untrue, we asked respondents whether the myth was true or false. As with the tourism myths, we asked students how many answers they felt they answered correctly (out of 10), how many answers fellow students answered correctly out of 10, and where they ranked in terms of correct answers on a scale of 1 to 100% compared to other students.

The last section asked a set of demographic and educational background questions. Data were collected on gender, age, and year of study (first year, second year, third year, fourth year, or postgraduate). Country and institution were captured automatically in the sampling process. We

also added four items from Oreg's (2003) resistance to change construct measured on a 7-point Agreement Likert to assess how resistant to change students perceived themselves to be.

For the Cognitive Reflection Test/Cognitive Reflection Test-2 logic questions, the tourism myths, the science-related myths, and Oreg's resistance to change items, the order in which the items were presented to the respondent was randomized by the survey platform to minimize any bias due to ordering effects (Sekaran & Bougie, 2016). A pilot study was conducted with one cohort of students at one of the universities to assess the reliability and validity of the survey instrument. A review of the preliminary results suggested that students understood the questions, and the instrument measured what it intended to measure.

Samples and Sampling

As this study seeks to determine the extent to which tourism and hospitality students believe in commonly purported myths, we surveyed students at different stages of their studies at universities in various countries. By surveying students at different stages of their programme, we can assess the extent to which their affirmation of commonly held tourism 'truths' change across cohorts. By surveying students from different countries and institutions, we address the issue that students from certain institutions could be taught commonly held tourism 'truths' and hence more susceptible to the Dunning Kruger Effect. By opting to sample a diverse range of countries and institutions, the researchers are able to make generalisations that go beyond individual contexts. We note that learning and teaching styles and pedagogies can vary across cultures and we acknowledge that sampling one student population would enable some variables would be constant. Nevertheless, we believe that a more 'global' approach provides a better assessment of the tourism scholars' understanding of tourism myths. Although we do capture cross-cultural differences where we can compare results between cultures, this is beyond the scope of this research.

The international partners for the project were recruited through the first author's professional network. Partners were provided with an Information Sheet and proposed survey instrument and invited to join the project. After agreeing to participate, fellow researchers were provided with a survey link with which to test the survey. Where needed, ethics approvals were obtained by the respective universities. If the tourism programme was not taught in English, the researcher translated the questionnaire, and the translated survey was uploaded to the survey platform. Students had the option to complete the survey in English, Simplified Chinese, Traditional Chinese, Estonian or Latvian. A link to the survey was created for each individual institution, whereby the researchers distributed the link to their students. The link was placed on course pages of the Learning Management Systems (Moodle, Canvas, ...) of participating universities. Students were encouraged to complete the survey through in-person reminders during face-to-face classes or through online announcements via the Learning Management System. The title page of the online survey informed students of the aim of the survey, that participation was voluntary, that they could withdraw from the survey at any time without punishment, that the survey was not a test, and that responses (or non-responses) would not affect their grades. Indeed, there was no way for the researchers to link survey responses to individual students, as no personal information was collected.

Given different semester starting dates, data were collected from 22 universities from November 2021 to May 2022. At the end of this data collection period, and after cleaning the data set for

non-responses, the total sample size was 1,493. The survey took approximately nine minutes to complete. Table 1 shows the sample profile of these 1,493 students. In line with tourism programmes around the world, a large majority of students were female. The sample included a mix of students at different levels of their programme – approximately one in seven (14.4%) were first-year students, with 8% postgraduate students. The mean and median ages of students were 23.6 years and 22 years respectively. Almost three in five students (57.7%) chose to complete the survey in English. Combined, about one-third of students (33.5%) chose to answer the questionnaire in Chinese, either Simplified or Traditional. Estonian and Latvian were the other languages used by students. The 22 universities came from 16 different countries with Europe, Oceania, Africa, Asia, North America, and the Caribbean represented. Thus, the sampling procedures resulted in a large sample in terms of demographics and a diverse range of geographic and cultural characteristics.

Table 1: Profile of Sample

Demographic Variable	%	Demographic Variable	%
Gender		Country of University	
Male	32.6	Austria	4.1
Female	63.0	Barbados	4.1
Non-binary	1.6	Canada	1.3
Prefer not to say	2.8	Estonia	8.3
Year of study		Fiji	13.0
1 st Year	14.4	France	8.5
2 nd Year	22.2	Ghana	1.0
3 rd Year	35.7	Hong Kong SAR	3.6
4 th Year	19.7	India	3.9
Postgraduate	8.0	Latvia	0.5
Age		Macau SAR	35.2
21 years or younger	33.3	New Zealand	1.9
22 or 23 years	35.5	Sri Lanka	0.5
24 years or older	24.6	Thailand	2.3
Mean (years)	23.6	UK	2.3
Median (years)	22.0	USA	9.4
Language			
English	57.7		
Simplified Chinese	22.1		
Traditional Chinese	11.4		
Estonian	8.3		
Latvian	0.5		

Results

Table 2 lists the 30 tourism myths. Most agreements of commonly held tourism truths were related to the supposed economic benefits of tourism. Over 80% of students agreed that

“Tourism is an industry”, “Tourism is a significant generator of jobs” and “There are significant economic and employment benefits of tourism”. Conversely, there was a higher proportion of disagreement on *“Tourism is a clean sector”, “Tourism perpetuates colonialism/tourism is neo-colonialism” and “Tourism lacks theory”*. The tourism myths where students tended to be undecided included *“Tourism protects the environment”, “Tourism leads to conflict” and “Small scale tourism is preferable”*.

Table 2: Agreement regarding Tourism Myths (Percent)

Tourism Myth	Agree	It Depends	Disagree
Tourism is an industry	87.6%	9.4%	2.9%
Tourism is a significant generator of jobs	82.7%	15.9%	1.5%
There are significant economic and employment benefits of tourism	82.5%	16.2%	1.3%
High satisfaction leads to loyalty, intention to return, and actual repeat visitation rates	73.7%	23.6%	2.7%
Tourism provides a range of positive social benefits	68.1%	30.7%	1.3%
The multiplier effect of tourism is useful for determining the economic impacts of tourism	67.2%	30.3%	2.4%
Tourists seek authentic experiences	66.0%	31.5%	2.4%
Tourism revitalizes culture	58.6%	38.4%	3.0%
Tourism is a discipline	58.4%	29.4%	12.2%
Special interest tourism is the future of tourism	56.0%	38.0%	6.0%
Carrying capacity works in tourism	56.0%	38.4%	5.6%
Willingness to pay is useful to determine the premium value of green products	55.9%	36.0%	8.1%
Tourism commodifies culture	54.6%	41.0%	4.4%
Sustainability and the triple bottom line can be operationalized	53.5%	44.1%	2.4%
Tourism generates some positive economic benefits, but they are offset by massive social, cultural, and environmental impacts	50.6%	37.0%	12.5%
Ecotourism/ecotourists and other forms of alternative tourism/tourists are better than mass tourism/tourists	48.0%	42.2%	9.8%
People damage the environment, not tourism	46.4%	36.9%	16.7%
Tourism is the world’s largest industry	44.9%	26.5%	28.6%
Tourism is a path to economic independence	42.1%	42.3%	15.6%
Tourism promotes peace	41.2%	50.8%	8.0%
Tourism provides high-quality jobs	38.4%	53.4%	8.2%
Small scale tourism is preferable	33.1%	58.7%	8.2%
Ecotourism and ecotourism operators are more ethical than others	30.9%	53.7%	15.4%
Tourism perpetuates colonialism/tourism is neo-colonialism	20.2%	49.3%	30.5%
Tourism destroys tourism	18.8%	52.8%	28.4%
Tourism leads to conflict	17.0%	62.8%	20.2%
A traveler is better than a tourist	16.1%	55.9%	28.0%

Tourism protects the environment	14.8%	66.0%	19.2%
Tourism lacks theory	12.3%	34.2%	53.5%
Tourism is a clean sector	11.1%	41.8%	47.1%

Table 3: Belief in Science-Related Myths (Percent)

Science Myths	FALSE
<i>An egg can be cooked by placing it between two activated mobile phones.</i>	85.3
<i>Drinking cold water after meals can lead to cancer</i>	82.5
<i>The average person swallows eight spiders per Year</i>	66.2
<i>Chewing-gum takes seven years to pass through the human digestive system</i>	63.4
<i>Men think about sex every seven seconds.</i>	62.2
<i>Hair and fingernails continue to grow after a person's death.</i>	59.5
<i>The Great Wall of China is the only human-made object visible from the moon.</i>	56.8
<i>The number of people alive today is greater than the number of people who ever lived.</i>	53.8
<i>Hair grows back darker and thicker after it has been shaved.</i>	44.3
<i>We only use 10% of our brains</i>	34.4

Table 3 shows 10 science-related myths and the percentage of students stating that these myths are false (the correct response). The least likely to be believed were “*An egg can be cooked by placing it between two activated mobile phones*” and “*Drinking cold water after meals can lead to cancer*” at over 80%; while the most likely science-related myths to be believed were “*Hair grows back darker and thicker after it has been shaved*” and “*We only use 10% of our brains*”, which only 44.3% and 34.4% of students believed to be false.

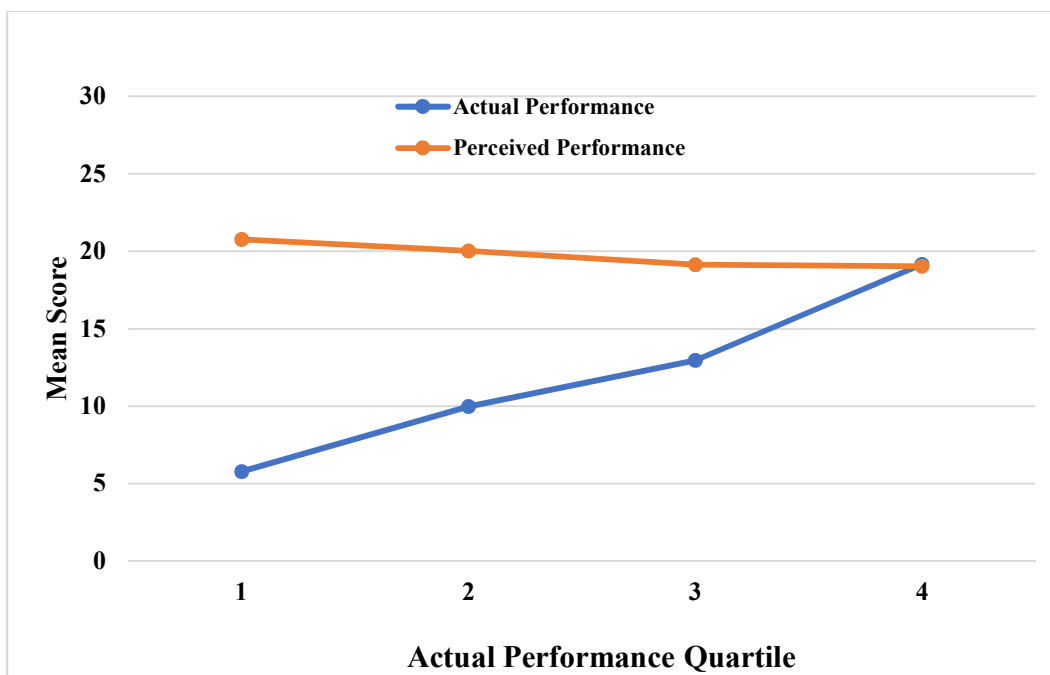
Table 4: Tourism Myths and Science Myths – Perceived Performance & Comparison

Overall Statistics	Mean
Tourism Myths (Correct out of 30)	11.9
<i>Considering the 30 statements above, how many, out of 30, do you think you answered correctly?</i>	19.8
<i>Based on your number of correct answers, please rank yourself on a scale of 1 to 100 out of every 100 participants</i>	66.3
<i>What do you think the average score out of 30, other tourism and hospitality students will attain?</i>	20.1
Science Myths (Correct out of 10)	3.9
<i>Considering the 10 statements above, how many out of 10, do you think you answered correctly?</i>	6.9
<i>Based on your number of correct answers, please rank yourself on a scale of 1 to 100 out of every 100 participants</i>	67.9
<i>What do you think the average score out of 10, other tourism and hospitality students will attain?</i>	6.8

In summary, Table 4 shows that, on average, tourism and hospitality students, stated ‘*it depends*’, on approximately 12 out of the 30 tourism myths. They believed they answered approximately 20 (19.8) correctly. They also believed that their peers would answer a similar number of answers correctly (20.1). With estimating that they answered approximately 20 answers correctly, they ranked themselves better than around 66% of all students. With respect to the science-based myths, the results were similar. Students scored almost four (3.9) out of 10 correctly (all the statements were false). However, students believed they correctly answered 6.9, on average of the 10 questions, similar to their perception of fellow students (6.8). For these questions, they also believed they would outscore around two-thirds (67.9%) of their fellow students.

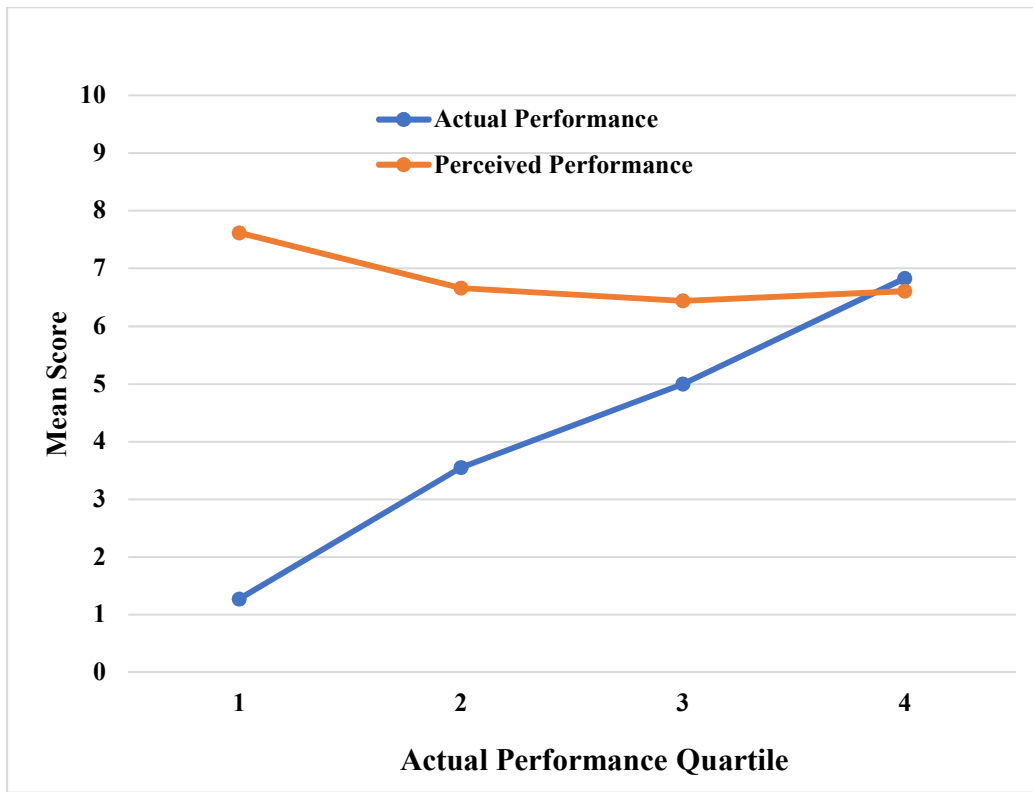
To test the Dunning Kruger effect, we categorized the students into quartiles based on their actual performance, in line with how Dunning et al. (2003) reported their results. We plot the mean scores of these quartiles against their perceived performance in Figure 1. Figure 1 shows students in the bottom quartile greatly overestimated the number of tourism myths they critically evaluated. Students in Quartile 1 anticipated that they would get almost 20 answers correct but only scored just over 5 questions correctly, on average. Students in Quartiles 2, 3, and 4 did this less so, with those in Quartile 4 estimating they would get 19 answers correct, almost identical to their actual performance. Students in Quartile 1 not only overestimated their performance by a significant amount but also perceived they would perform better than how students in Quartiles 2, 3, and 4 perceived how they would perform. The different performance of students in the four quartiles suggests there is evidence for the Dunning Kruger Effect.

Figure 1: Perceived versus actual Tourism Myths as a function of actual test performance



This same pattern holds for the science-related myths (Figure 2). In fact, students in Quartile 1 had a higher perception of their performance than those in Quartile 4 (7.6 versus 6.6). Further, students in Quartile 4 perceived that they may perform at a slightly lower level than they actually did (Actual = 6.8; Perceived = 6.6).

Figure 2: Perceived versus actual Science Myths as a function of actual test performance



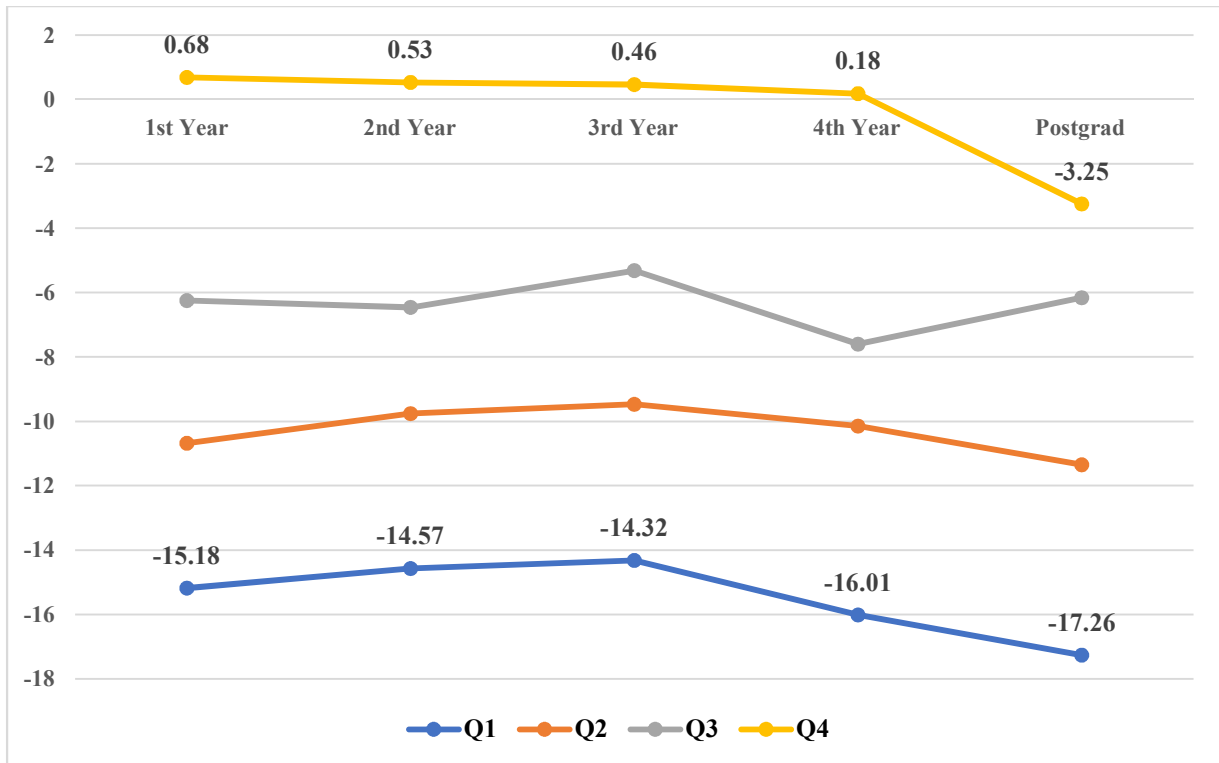
Dunning Kruger Effect by Year of Study

We supposed that as students progress through their studies, they will develop their critical thinking skills and start to question some of the myths and assumptions they may have learned in the mainstream and social media regarding tourism. Further reading and more in-depth study of tourism issues may expose students to a wider range of cases where the usual tropes concerning tourism may not hold and students may begin to appreciate that there are many nuances in tourism where blanket generalizations do not hold. As such, the Dunning Kruger Effect may lessen as students progress through their programmes. With this in mind, we segmented the data by year of study. We repeated the analysis that we conducted for the total sample whereby we categorized the students from each year group (1st Year, 2nd Year, 3rd Year, 4th Year, Postgraduate) into quartiles based on their actual performance and plotted the mean scores of these quartiles against their perceived performance. These figures for each year group can be found in the Supplementary material. Figure 3 and 4 summarise the results of this analysis.

Figure 3 shows the differences between actual and perceived performance by Quartile for each Study Year cohort. For example, for students in 1st Year, those in Quartile 1 perceived that they will score 20.8 out of 30 whereas they only scored 5.6 out of 30, a difference of -15.2. Conversely, students in Quartile 4 predicted they would score 19.1, and they actually scored 19.8, a difference of 0.7. They scored higher than they predicted. We can see a similar pattern for 2nd Year and 3rd Year students with a closing gap (smaller difference) in Quartiles 1, 2, and 3 for those in 2nd Year compared to those in 1st Year. The gap closed again for those Quartiles for 3rd Year students. This analysis implies that the Dunning Kruger Effect lessens as students move from 1st to 2nd Year and lessens again from 2nd to 3rd Year. Students appeared to be becoming

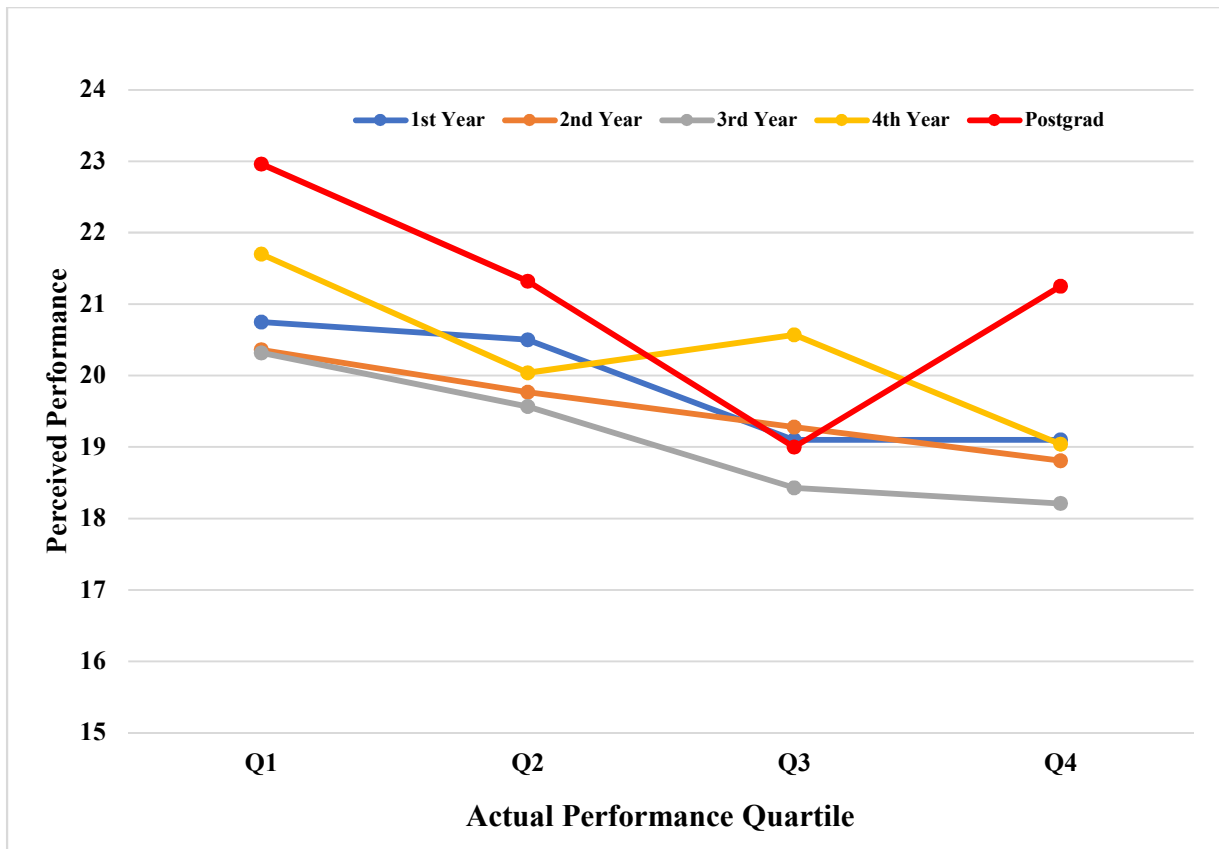
more critical thinkers, starting to doubt some tourism myths. However, the gap widened again for those students in 4th Year/Honours and Postgraduate studies. This suggests students entering into high-level degrees exhibit a stronger Dunning Kruger Effect.

Figure 3: Gap between Actual and Perceived Performance by Quartile



While actual performance did not differ much among Year of Study for each Quartile, the perceived performance of students did. In Figure 4, 3rd Year students rated their performance lowest across each Quartile. 2nd Year students generally had the next lowest perceived performance for each Quartile followed by 3rd Year students. This suggests that even for those students who perform poorly, they are more likely to recognise their poor performance in 3rd Year compared to 2nd and 1st Year. Postgraduate students, especially, and students in 4th Year/Honours more generally, had a high opinion of their abilities when it came to understanding tourism myths. Postgraduate students whose actual performance ranked them in Quartile 1 perceive they will score 23.0 out of 30 and postgraduate students in Quartile 2 also perceived themselves to perform well – above the performance expectations of students falling into Quartile 2 in other Year groups. Undertaking an Honours Year or Postgraduate studies may have led these students to be overconfident in their understanding of tourism. Being enrolled in a higher-level tourism programme may thus instil these students with a sense of being 'right' about tourism, which may inhibit a more critical reflection on the issues.

Figure 4: Perceived Performance by Quartile



Relationship of Tourism Myths with other Cognitive thinking measures

The following analysis determined the extent to which tourism myths correlated with other measures of rational thinking, such as the Cognitive Reflection Test/Cognitive Reflection Test-2 measures, Science Myths, and Cognitive Rigidity. Table 5 shows the Spearman correlation coefficients for the various measures of cognitive thinking. Countering Tourism Myths was not significantly correlated with Cognitive Reflection Test/Cognitive Reflection Test-2 and had a statistically significant but weak correlation with correctly debunking Science Myths ($r = -0.066$; $p = 0.013$) and Cognitive Rigidity ($r = -0.083$; $p = 0.002$). Although the relationship was weak, the negative correlation coefficient between Tourism Myths and Science Myths suggests that students who perform well on one measure may perform less well on the other. This implies that critical thinking about tourism issues may be different from that of the general logic domain. Further, having more critical thinking skills in relation to Tourism Myths is negatively related to being cognitively rigid. Being able to pause and think through statements made about tourism is related to the ability to be flexible enough to change your mind.

Table 5: Spearman correlations with measured cognitive thinking

Correlation Coefficient	Tourism Myths	CRT/CRT-2	Science Myths	Cognitive Rigidity
Tourism Myths	1			
CRT/CRT-2	0.031	1		
Science Myths	-.066*	-.142**	1	
Cognitive Rigidity	-.083**	0.03	-.061*	1

* = $p < 0.05$; ** = $p < 0.01$.

Discussion and Conclusions

As the debate on the commonly held ‘truths’ on tourism continues unabated into the post-pandemic period, understanding the common myths held by the tourism academy offers insights into how the industry can chart its way to contribute toward a more sustainable path. Up to now, current research assessing tourism myths across various levels among students has been non-existent. As the future generation of tourism scholarship and practice (Lee & Benjamin, 2023), tourism students’ capacity to consume information critically, and their ability to appreciate their weaknesses are vital ingredients to safeguard the future of the academy. Unpacking the risk associated with the least knowledgeable students who are incapable of assessing how much they know about the tourism scholarship could facilitate effective epistemological interventions and skill-set strategies to improve the industry’s performance towards broader sustainable development goals. This study addresses this inherent lacuna based on students from 22 universities in 16 different countries across Europe, Oceania, Africa, Asia, North America, and the Caribbean. In doing so, this study initially tested students’ beliefs about tourism myths; it assessed their convictions about these myths to ascertain the extent of the Dunning Kruger Effect; and it examined the association between these myths with other cognitive reflection tests and heuristic biases.

Results from this study substantiate the existence of the Dunning Kruger Effect among tourism and hospitality students. Students in our sample, particularly those low-performing ones, in terms of judging their performance against these myths, overestimate their abilities and rank themselves better than their peers. In line with previous work that demonstrates the Dunning Kruger effect among students in other disciplines (e.g. Mattern et al., 2010; Pavel et al., 2012; Pazicni & Bauer, 2014), we observe that overconfident students tend to be less sceptical about common tourism myths. Moreover, such an effect is stronger among first-year students and senior students (final-year and postgraduate). Students seem to become more confident after completing a major stage of education. For first-years, successful completion of high school and admission to university could be an important life-changing event and confirmation of their abilities.

Similarly, for postgraduate students, finishing a bachelor’s degree and being admitted into a postgraduate program is also a source of pride. Another possible explanation could be the use of tourism myths (e.g., tourism is a high-income earning industry and employer) to lure students’ applications into undergraduate and postgraduate programs. University marketing often disseminate common myths that are believed by students who, at the beginning of their studies, become complacent that they already know so much about this industry, but lack knowledge (Educations.com, 2021). Further, there may be a segment of postgraduate tourism and hospitality students accepted onto those programmes with a non-tourism Undergraduate qualification, so in

essence, they are similar to first-year students when it comes to tourism knowledge. Another explanation could be cross-cultural differences in tourism contexts as students may take postgraduate studies in a different cultural setting to their undergraduate studies. This is an area for future research.

The relatively stronger Dunning Kruger Effect demonstrated by postgraduate students deserves further attention. Postgraduate studies are academically challenging, requiring students to be sceptical about existing norms to develop new ideas. Inertia, or having a firm belief in myths, is problematic for postgraduate students because it limits their capacity to appreciate the complexity of tourism and to challenge traditional theories that fail to adequately explain the tourism phenomenon (Kompier, 2006; McKercher & Prideaux, 2014). Furthermore, firm believers are usually unaware of the need to change their mindset thus further inhibiting the development of tourism knowledge. This scenario perpetuates a double curse syndrome since the knowledge required to criticize the myths is the same required to change their mindset (Dunning et al., 2003). Similar to Koc's (2021) findings, following the rationale behind the Dunning Kruger Effect, overconfidence could potentially hinder one's self-development and professional advancement.

Students who performed well on tourism myths did less well on science myths, implying that critical thinking about tourism issues may be a different domain than the more general logic one. This outcome is consistent with the fundamental divide between natural and social sciences – the way natural and social scientists come to understand the world and identify 'truths' (Knorr-Cetina, 1981). It has been common practice for natural scientists to develop law-like formulas and theories by conducting laboratory-based experiments to study a deterministic world. Social scientists, on the other hand, do not aim to predict the future accurately, as human behaviours and societies are dynamic, complex, and can change over time. Perhaps this explains the negative correlation between students' critical thinking skills in relation to tourism myths and their cognitive rigidity identified in this study. The fact that there is often no absolute truth in social science requires students to recognize the complexity of human behaviours and to develop a flexible mindset. These findings highlight broader implications for tourism teaching, research, and supervision.

Theoretical Implications

This study used data from different countries and regions to present empirical evidence on the extent to which tourism and hospitality students demonstrate critical thinking when encountering common tourism myths. The use of a student sample complements previous works, which were mostly done in a commercial context using employees as study subjects. The findings support the existence of the Dunning Kruger Effect and the relationship between overconfidence and incompetence, revalidating individuals' perceived ability and actual behaviours as two different constructs (Sullivan et al., 2019).

The relatively stronger Dunning Kruger Effect demonstrated by postgraduate students, a segment of which will proceed to be the next generation of the tourism academia raises questions on postgraduate teaching priorities which have recently been re-echoed by other scholars (Lee & Benjamin, 2023; McKercher & Dolnicar, 2022; Thorne, 2016). While it may be beyond the scope of this research to advocate for tourism professors to change students' attitudes, what is taught and how knowledge is imparted are viable ways to bring transformation. Rather than

teaching students to be critical thinkers and nurturing growth for quality academics through teaching them to maintain a healthy scepticism towards theories and concepts of tourism, postgraduate students are taught complicated models of data analysis shifting priorities away from the basic competencies (Lee & Benjamin, 2023).

It is now a cliché for tourism educators to advocate for ensuring tourism teaching centres on theory and practice (Tribe, 2000). Nonetheless, how many postgraduate curricula allow postgraduates to critique many of the classical theories in tourism and their practical relevance to real problems? Are tourism educators teaching basic theories as absolute truths? Students today seem unaware of the many gaps in tourism scholarship not to mention developing innovative approaches to new aspects of tourism (Tribe, 2006b). It is not uncommon for decision makers and institutional policies to set broad educational priorities of curricula design and how tourism knowledge is being imparted. However, this study calls for re-prioritising evaluative competencies in tourism education that encourages students to question the evidence on which assumptions are based and decisions are made. Criticality in this context thus concerns their general capacity to question the validity of data and of any decisions these inform. Competence-based teaching that aims to provide the abilities needed by tourism graduates will enhance quality teaching.

Beyond the debates of limited teaching and learning that promotes critical thinking skills, the study findings also have implications for the quality of tourism research. The existence of overconfident but less competent students raises questions about the sources of students' knowledge and how they acquire knowledge that creates this overconfidence. According to the Dunning Kruger Effect (Kruger & Dunning, 1999), the students in this study with lower critical abilities are less likely to question the sources of knowledge and how tourism research is produced. A wider implication extends to the segment of students who go on to undertake academic research, where their lack of critical thinking may impact research that is conducted, which in turn, raises questions about the quality of some tourism research.

Overconfident students may lack the ability to discern where the quality of their research papers fits, unnecessarily burdening the editors and reviewers of tourism and hospitality journals. They are also less likely to accept rejections and constructive comments, which inhibits their ability to reflect and improve due to a sense of being 'right'. While poor-quality papers may be rejected from high-quality and rigorously peer reviewed journals, the increasing presence of predatory journals that allow weak quality papers to be published means everybody now has opportunities to generate knowledge whether sound or unsound (McKercher & Dolnicar, 2022).

Reemphasizing university research standards towards quality and rigour over quantity and superficiality can instil caution in postgraduate research students.

A wider risk of students' inability to consume information critically has implications for knowledge advancement of the academy. As tourism is still a maturing field of study, pre-determined beliefs are dangerous as they influence how individuals accept new information, recognize their biases, and cultivate research creativity (McKercher & Prideaux, 2014). Overconfident individuals tend to have lower intentions to question themselves and to seek new knowledge. They often resist counterarguments and insist on their beliefs (Anson, 2018). As individuals who overestimate their abilities tend to underestimate a task, overconfident doctoral students may put less effort into their research process, jeopardizing research quality (Folk, 2016; Vancouver et al., 2001; Verhaeren, 2012). Supervisors of doctoral students should evaluate their students' personality and critical thinking skills and contemplate the following: are students

able to spot their stereotypes and weaknesses to self-correct and develop new skills? Do they ask questions to challenge how tourism knowledge has been formed and educated? Are they willing to go further to develop innovative methodologies and theoretical perspectives to study tourism-related issues? Nurturing a flexible and open mindset among young researchers will be critical for the production of legitimate tourism knowledge and research.

From a disciplinary perspective, the inverse relationship between students' performance on tourism myths and those of science myths highlights that the high acceptance of myths is discipline related. Recent experimental studies among introductory macroeconomic students confirm that students who have acquired a threshold of knowledge in basic economic theories presented in books as absolute truths think of themselves as competent enough to solve any world problems (Sawler, 2021). The consistency with previous studies points to the possibility of disciplinary-related issues as it is common for many tourism books to repeat concepts such as "tourism", "tourist" "motivations" and "host community" (Filep et al., 2015). Tourism students are exposed to these concepts up to a threshold where they begin to think of themselves as knowledgeable, particularly at the postgraduate where they have had immense conceptual exposure. While the study findings suggest that critical thinking about tourism may be a different domain than the more general logic one, tourism is a multi-disciplinary phenomenon that requires students to acquire knowledge beyond tourism (Cohen, 1988). There have been earlier calls for inter-, multi- and post-disciplinary approaches that promote the plurality of the discipline (Coles et al., 2006; Filep et al., 2015; Lugosi, 2020). These findings re-emphasise these calls.

Examining students' self-perception alongside their competencies has implications for how we conceptualise their learning within and across higher education. The finding that 3rd Year compared to 2nd and 1st Year tend to recognise their poor performance, but this progression drops from 4th Year/Honours into postgraduate demonstrates a dynamic and uncertain critical learning curve. Hence, this study's results suggest the need to avoid viewing the development of critical thinking skills as a linear process, improving over time, and appreciating that these capacities may degrade or be compromised across educational timeframes. The data indicate the existence of what we may call points of intellectual hazard at different educational stages. To develop a better understanding of students' self-conceptions, their subsequent engagement with complex ideas, and the role of andragogic interventions at specific points along educational journeys, further research is needed to evaluate the presence and impacts of such hazard points in other learning contexts. If the effects of these hazards are confirmed, it is necessary to identify the key factors among students or in the educational provision that perpetuate or negate the risks for learning at these key periods.

By ascertaining students' beliefs in common tourism myths (McKercher & Prideaux, 2014), this study contributes to epistemological scrutiny of the tourism academy (Tribe, 2004). Extending Butler's (2015) work, this study suggests how some students believe the current paradoxes and fallacies in the tourism scholarship without critical analysis of scholarship. The Dunning Kruger Effect found in this study raises critical epistemological questions about the nature of current fallacies acquired at different levels and whether critical platforms and peer-to-peer competency assessment opportunities exist for students to question tourism knowledge.

In addition to identifying these epistemological insights, our findings suggest that myths may be domain-specific, for example, high performance in one knowledge domain (i.e. tourism) may not

correspond to capacities in other domains (e.g. general science). This may be interpreted as reflecting learning and teaching practices in specific fields (and levels), for instance regarding critical thinking in secondary or high school-level science education. It also raises the question of whether evaluative capacities in some practice domains, particularly in social sciences, develop (or are developed) differently; and, if so, how lessons from those areas of learning and teaching practice may be utilised to develop a wider and more transferable set of critical thinking skills.

Practical Implications

In higher education institutions, teaching faculty normally focus their energy on preparing course materials and lecturing without paying much attention to students' personalities and their effects on learning behaviours. No corresponding actions will be taken if management and teachers fail to recognize the potential negative impact of the Dunning Kruger Effect on student engagement and performance. While identifying overconfident students might not be straightforward, our findings draw educators' attention to first and fourth-year undergraduate students as well as postgraduate students. Relying on students to discover their weaknesses could be difficult, and strategies should be devised to identify students who need greater attention. Activities such as debate competitions that create opportunities for students to ask questions and learn more about themselves could be organized regularly. Teaching them to develop counterfactual arguments could also help them to test embedded assumptions. Observing how students react when challenged or criticized also helps identify those who demonstrate a stronger Dunning Kruger Effect. Teaching plans could be developed separately, for example, for students with higher confidence but lower abilities and those with lower confidence but higher abilities. The teaching plan for the former group can focus on helping students to recognize their weaknesses and improve their critical thinking skills. For the latter group, teachers can focus on encouraging students and improving their self-confidence.

The result that only a minority of students in our sample answered the myths questions correctly prompts us to rethink how tourism knowledge has been taught in classrooms. Have tourism concepts and theories been taught as if they were law-like perpetual truths? Have educators done enough to ensure students understand the nature of social science and give enough room for students to question their uncertainties about tourism-related issues? Have academics, who are increasingly delivering tourism-related education in the contexts of business or management schools, promoted the good side of tourism without adequately stressing the dark side of it or vice versa? Specifically, the design of postgraduate programs should not focus on content delivery or simply informing students what tourism is all about but encourage students to discover new problems and creative problem-solving methodologies.

From a practical perspective, this study highlights the need for postgraduate supervisors to be aware that their students' enrolment into postgraduate studies can instil a sense of overconfidence, which could inhibit their critical reflection at the early stages of their study. Postgraduate supervisors may need to create an atmosphere that allows their students to share their ideas on critical platforms such as academic conferences, research discussion teams, and postgraduate research seminars where their works are evaluated by others and they receive developmental feedback to shape their critical thinking. Postgraduate supervisors could assist less-competent students who overestimate their knowledge through critical reading assignments and discussions.

Limitations and Future Research

Despite the significant contributions offered by the findings of this study, some limitations need to be acknowledged and addressed in future studies. While the research team employed feasible approaches to reach participants located in different parts of the world, our sample did not systematically cover all cultures, which can be addressed by future research. Exploring the potential impact of cultural differences on the Dunning Kruger Effect will also be meaningful as differences between eastern and western education have been obvious.

We assessed students' self-awareness and critical thinking skills through choosing 'it depends' on a three-item scale along with the choices 'agree' or 'disagree'. By setting the response options to Agree/It Depends/Disagree, we force the student to make a definitive choice. We opted for these response items rather than a 7-point Likert scale due to the Likert scale's more diverse and more ambiguous range of responses. Dolnicar (2021) also raised the question about the usefulness and appropriateness of using Likert scales. However, we note the limitation that choosing 'It depends' may not only represent a student's humility and admission of uncertainty but the student may have chosen 'it depends' out of ignorance. Alternative response choices may have given more nuanced results, although the wider range of responses would have been aggregated to provide some measure of whether the student agreed, disagreed or questioned the myth.

Since we focused on the level of the Dunning Kruger Effect exhibited by students, it will be interesting for future research to explore the causes of such an effect. What shapes students' mind-sets and critical thinking abilities will be another interesting topic to explore. Identifying the root of overconfidence may help educators better plan their teaching strategies. As noted above, future research may attempt to distinguish key periods where the Dunning Kruger Effect has a greater impact and use this to design and evaluate interventions at different points across courses. As critical thinking is particularly important for doctoral students, future studies may expand the sample size of doctoral students and gauge the extent to which the Dunning Kruger effect influences these future knowledge makers. While it is beyond the scope of this study to compare whether students in specific disciplines such as tourism score more or less than students in other disciplines, this is also an interesting topic for future research.

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