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EDITED BY
Remo Job,
University of Trento, Italy

REVIEWED BY
Claudio Tonzar,
University of Urbino Carlo Bo, Italy
Paul Geiss,
University of Vienna, Austria

*CORRESPONDENCE
Jacquelyn Cranney
j.cranney@unsw.edu.au

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Charting the psychological literacy landscape: Systematic review highlighting psychology education

Jacquelyn Cranney[1]*, Sue Morris[1], Kimberley Norris[2] and Caitlin E. Connolly[2]

[1]School of Psychology, University of New South Wales, Sydney, NSW, Australia, [2]School of Psychological Sciences, University of Tasmania, Hobart, TAS, Australia

The aim of this systematic review is to provide, for the first time, a broad overview of the scope and nature of the current English language concept of 'psychological literacy' (PL) as evidenced in the literature, primarily since 2010. Covidence systematic review methodology yielded 112 papers that were scored on 23 specific criteria/questions relevant to addressing predetermined research questions. PL has been conceptualized as both a general capability (e.g., ethical application of psychological knowledge) and a group of capabilities (discipline-specific knowledge and research methods, and more generic capabilities such as communication). Variability in the constellation of group capabilities has led to challenges in operationalization and thus measurement, signaling the need for international consensus and improved measurement. We propose a model for how PL is related to psychologically literate citizenship and global citizenship. Key papers explore PL as an integrative concept in psychology. All papers were relevant to psychology education, with most prevalent being undergraduate level, and least prevalent being graduate level. There were numerous papers providing practical PL teaching and assessment strategies. PL as a pedagogical approach has been a necessary and richly diverse focus. Finally, a revisioning of PL within the context of psychology education, as well as recommendations for further research and development, are suggested.

KEYWORDS

psychological literacy, psychology education, undergraduate, citizenship, pedagogical approach, Covidence systematic review, international consensus

Introduction

The aim of this systematic review is to provide a broad overview of the scope and nature of the current English language concept of "psychological literacy" (PL) as evidenced in the literature, primarily since 2010. We explore questions about the internationality of the term, the conceptual development of the term and its relationship to the notion of citizenship, its penetration into different levels of education, the existence of relevant teaching and assessment strategies, its measurement, the impact on pedagogy, and the potential for psychological literacy to be an integrative concept in psychology.

For this paper, we take McGovern et al. (2010) as the starting point for the modern English language understanding of PL. Almost all of the papers reviewed here refer to this paper. We also include two relevant "precursor" papers[1] (Boneau, 1990; O'Hara, 2007) to McGovern et al. (2010), along with an educational report by Cranney (2008) which referred to the upcoming McGovern et al. (2010) chapter (first drafted in 2008). As summarized by Morris et al. (2021), McGovern et al. conceptualized PL as "encapsulating nine graduate capabilities that UG psychology major students should acquire, including discipline knowledge and its application to personal, professional, and societal contexts; developing scientific, critical, and creative ways of thinking; and behaving in an ethical and diversity-respectful manner" (p.3). Morris et al. (2021) refer to this kind of conceptualization as a "group" definition because the concept is a list of different capabilities which together make up the concept of PL, and such definitions are tied to broad psychology education outcomes.

In contrast to this "group" category of PL definition is the "general" category definition of PL (Morris et al., 2021). Perhaps the most commonly cited example is that of Cranney et al. (2012a), who defined PL as "the general capacity to adaptively and intentionally apply psychology to meet personal, professional and societal needs" (p. iii). Note that this definition is not tied to formal education. The existence of these two different approaches (group *vs.* general) to defining PL has caused some consternation amongst psychological scientists and educators, especially when different group definitions include different capabilities; consequently, the construct validity of PL has been questioned (Newell et al., 2020, 2021). Given the methodology of the current review, we cannot empirically address this issue; instead, we report on the frequency and nature of both group and general definitions of PL, as well as on the prevalence of papers attempting to measure PL based on these definitions, and then discuss theoretical and practical implications.

Another conceptual discrepancy within the recent PL literature relates to the distinction between the term PL and McGovern et al. (2010) "concept of a psychologically literate citizen – someone who responds to the call for ethical commitment and social responsibility" (p.10). Although "acting ethically" and "fostering respect for diversity" are two of the nine capabilities that McGovern et al. list as encompassing PL, the distinction is that the psychologically literate citizen has a values-driven intention to apply their PL to "the common good". In this review we identify the papers that use the terms "psychologically literate citizen" (PLC), "psychologically literate global citizen" (PLGC), and "global citizen" (GC), and then discuss these distinctions further.

In considering the landscape of PL, this review considers how international, and how collaboratively international, is work on PL, taking into account the limitation that only English language papers are included in this review. We then identify what have been the main types of publication forms (e.g., peer-reviewed journal articles, chapters, reports), and consider whether this pattern has changed over the years.

Given that McGovern et al. (2010) creation of the term was within the context of psychology education, it would not be surprising that much of the literature is situated within that context, but in this review we test that assumption. Then we review the distribution of papers across different levels of education (i.e., pre-tertiary, undergraduate, graduate, interprofessional, public education), and the implications of this distribution for theory and practice. Given the argument that PL should be the outcome of psychology education (Halpern, 2010), we also determine the prevalence of papers that provide educators with practical teaching and assessment strategies, and the implications of those findings.

A key consideration in this review is the translational impact of PL, particularly in terms of the teaching of PL and the associated pedagogy. The original McGovern et al. (2010) paper raised these issues, which Morris et al. (2021) termed "PL as a pedagogical philosophy", whereby one inherent aspect is a commitment to PL as an outcome of psychology education. Other aspects (also referred to by McGovern et al., 2010) include (a) the use of evidence-based (or evidence-informed) teaching, and (b) the role-modeling of PL in other ways. As such, it was important to identify the prevalence of papers on this topic and the associated implications for theory and practice.

Finally, McGovern et al. (2010) spoke of the potential for the term PL to unite psychology education, research and practice:

> "The unifying concept of psychological literacy has great potential to capture the imagination of diverse stakeholders invested in transforming higher education. With common understandings and rigorously defined standards, there still remains a healthy diversity in undergraduate programs. There was a commonly espoused principle in all that we read, with a bright spotlight shining on the universal demands for citizens' wellbeing and health care, and a need for greater commitment to those populations who have still-limited participation in the fruits of economic growth. Psychologists need to be leaders in these areas, especially because we can contribute integrated scientific and practitioner strengths" (p.19).

Interestingly, this quote somewhat transgresses their distinction between PL and PLC. Nevertheless, it raises the

1 Boneau (1990) gives the first known published reference to the term. The study involved the collation of 1000 key terms which students should understand. For Boneau, this knowledge then defined psychological literacy. In the second precursor paper, O'Hara (2007) used "psychological literacy" in the sense of McGovern et al. (2010) "psychologically literate citizenship".

question of whether other PL/PLC papers also speak of this possibility, and the implications of adopting such an approach.

The research questions addressed in this study are grouped under three headings.

PL General Landscape:

- How international, and how collaboratively international, is the PL literature?
- What is the nature of the publication type (e.g., peer-reviewed journal vs. other types) for the PL literature, and has this changed over the years?

PL Conceptual Landscape:

- Which papers are considered to have made a significant contribution to the development of the concept of psychological literacy?
- What is the prevalence of papers that conceptualize PL as a general capacity compared to a group of capacities?
- What is the prevalence of papers that refer to the terms psychologically literate citizen, psychologically literate global citizen, or global citizen?
- What is the prevalence of papers that address the measurement of PL?
- How prevalent are papers that consider PL as a unifying concept in psychology?

PL Education Landscape:

- What is the prevalence of PL papers that have relevance to education, and what is the distribution across different levels/domains of education?
- How prevalent are papers that provide educators with practical teaching and assessment strategies for PL?
- How prevalent are papers that address PL as a pedagogical philosophy, with its various aspects?

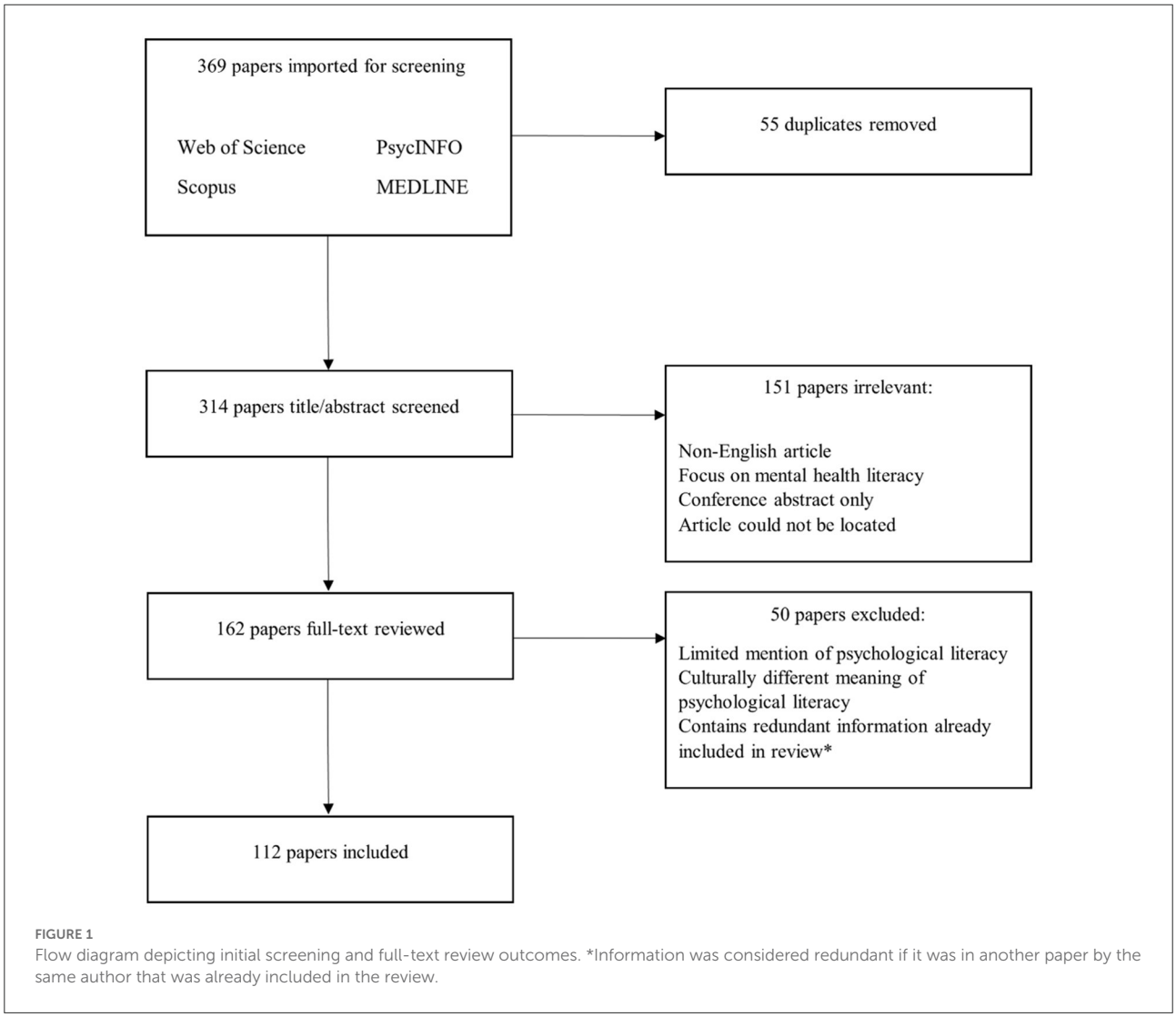

FIGURE 1
Flow diagram depicting initial screening and full-text review outcomes. *Information was considered redundant if it was in another paper by the same author that was already included in the review.

Where appropriate, we (a) give some guidance to readers by briefly describing example papers related to these research questions, (b) identify gaps in the literature, and (c) expand on theoretical and practical implications.

Method

The Cochrane Handbook of Systematic Reviews of Interventions (Higgins et al., 2011) was followed in order to achieve transparency and consistency in the reporting of results. Selected electronic databases (Web of Science, PsycINFO, Scopus, MEDLINE) were searched for the term "psychological literacy" (see Supplementary material for syntax used and number of papers retrieved). Each database was searched from inception to the date of the first search (18/3/2021). Additional papers from various sources were also identified (up to 31/7/2021) through citation searching of included papers, and through correspondence with authors of included papers (see Supplementary material for additional details of this process). A final search (using the same databases as the original) was undertaken on 20/03/22. All identified papers were entered into the Covidence platform for initial screening and full-text review. A number of exclusion criteria (see Figure 1) were defined prior to abstract screening and full text review. Retrieved papers were distributed and screened by co-authors JC, SM, KN and CC against inclusion and exclusion criteria (see Figure 1 for details of initial and full-text screening stages and paper outcomes). All conflicts in both screening stages were discussed and resolved among authors.

The data extraction process involved 23 questions in the domains of identifying details of the paper and author/s, conceptualization of PL, relevant level of psychology education (e.g., pre-tertiary) and contribution to the body of knowledge relating to PL (see Supplementary material). Two co-authors (JC, SM) independently reviewed and completed data extraction of all papers for all questions, and one co-author (KN) independently reviewed Q7 ("Within the context of when it was written, how much does this paper contribute to our conceptual understanding of PL?"). Despite the lack of explicit criteria for this rating, there was minimal disagreement amongst the raters, which was consensually resolved (see Supplementary material). Throughout the data extraction process, conflicts were resolved *via* discussion between the co-authors until a justified consensus was reached (see the Supplementary material for an example of conflict resolution processes). Chi-square tests of independence were conducted on included papers to examine the quantity and type of papers published over time.

Results and discussion

PL general landscape

Table 1 presents the assigned number for each of the reviewed papers, arranged by year of publication.

How international, and how collaboratively international, is work on PL?

Table 2 presents the national affiliation of the first author, including an indication of co-author multi-nationality. The first five nations mentioned are native English language speaking, which is not surprising, given that one of the inclusion criteria was that the paper had to be written in English. In the most recent period of 2020 to 2022, the constitution is somewhat similar to the total, with: 6 Australia, 4 USA, 4 UK, and one each from Canada, Germany, and Slovakia. There were 13 (11.6%) multinational co-authored papers, whereby the first co-author was affiliated with Australia (5), USA (4), UK (3), and Slovakia (1). Again, there is bias toward native English language countries, but approximately 12% multinational co-authorship is a reasonable proportion given that the concept of PL is relatively new.

What is the nature of the publication type (e.g., peer-reviewed journal vs. other types) for the PL literature, and has this changed over the years?

Table 3 presents type of publication and indicates that overall there were 47 chapters, 41 journal articles, 10 peer-reviewed reports, 6 Others, 4 books, 3 conference proceedings, and one edited book. Figure 2 presents the total number of papers across four time periods: 2010-2012; 2013-2015; 2016-2018; and 2019-2021. The greatest number of papers appears to be in the first time period, however a Chi Square analysis revealed no significant differences in numbers of papers across time periods. Because peer-reviewed journal articles are often considered the highest value publication type, these data are also summarized in Figure 2. The number of this type of paper appears to have increased since the first time-period, however a Chi Square analysis revealed no significant differences.

In summary, publication output on PL has been sustained; however growth in quantity, quality (e.g., journal articles), and representation across diverse landscapes (e.g., language) is required if this concept is to have global impact into the future.

PL conceptual landscape

Which papers are considered to have made a significant contribution to the development of the concept of psychological literacy?

The three raters scored on a 5-point scale (with higher scores indicating greater contributions) their answer to Q7 ("Within the context of when it was written, how much does this paper contribute to our conceptual understanding of PL?"). There were six papers receiving a rating of 5, and four papers receiving a rating of 4 (see Supplementary material for complete

TABLE 1 Review numbers for each paper by year (Q.2).

Year; #	Authors	Year; #	Authors	Year; #	Authors
1990		38	McGovern and Brewer, 2012	76	Lilienfeld et al., 2017
1	Boneau, 1990	**2013**		77	Tomcho and Foels, 2017
2007		39	APA, 2013	78	Winstone and Hulme, 2017
2	O'Hara, 2007	40	Burton et al., 2013	79	Winstone and Kinchin, 2017
2008		41	Butler and Halpern, 2013	**2018**	
3	Cranney, 2008	42	Cranney, 2013	80	Cranney and Morris, 2018
2010		43	Cranney et al., 2013	81	Dudgeon et al., 2018
4	Halpern, 2010	44	Mair et al., 2013	82	Hamilton et al., 2018
5	McGovern et al., 2010	45	Morris et al., 2013	83	Landrum and McCarthy, 2018
2011		46	Reddy et al., 2013	84	Morris et al., 2018
6	APA, 2011	47	Watt, 2013	85	Morrissey et al., 2018
7	Beins et al., 2011	**2014**		86	Roberts and Gasson, 2018
8	Bernstein, 2011	48	Amsel et al., 2014	87	Taylor and Hulme, 2018a
9	Burton and McDonald, 2011	49	Banyard and Duffy, 2014	88	Taylor and Hulme, 2018b
10	Charlton and Lymburner, 2011	50	Cormack et al., 2014	**2019**	
11	Cranney and Dunn, 2011a	51	Hulme, 2014	89	Brooker and Woodyatt, 2019
12	Cranney and Dunn, 2011b	52	James, 2014	90	Geiss, 2019
13	Cranney and Dunn, 2011c	**2015**		91	Hulme, 2019
14	Cranney and Morris, 2011	53	Banyard and Hulme, 2015	92	Pusateri et al., 2019
15	Cranney et al., 2011	54	Cranney et al., 2015	93	QAA, 2019
16	Davidson and Morrissey, 2011	55	Dunn et al., 2015	94	Taylor, 2019
17	Denson and Ing, 2011	56	Dunn and McMinn, 2015	95	Taylor and Coady, 2019
18	Dudgeon et al., 2011	57	Hulme et al., 2015	**2020**	
19	Dunn et al., 2011	58	Kent and Skipper, 2015	96	Bernstein et al., 2020
20	Goedeke and Gibson, 2011	59	Murdoch et al., 2015	97	Cranney, 2020
21	Green et al., 2011	60	National Psychology Curriculum Roundtable (NPCR), 2015	98	Cranney et al., 2020
22	Halonen et al., 2011	61	Newstead, 2015	99	Dunn and Halonen, 2020
23	Halpern and Butler, 2011	62	Nissley and Atwood, 2015	100	Elliot, 2020
24	Harre et al., 2011	63	Roberts et al., 2015	101	Martin et al., 2020
25	Job et al., 2011	64	Taylor and Hulme, 2015a	102	Newell et al., 2020
26	Karandashev, 2011	65	Taylor and Hulme, 2015b	103	Sokolova and Williamson, 2020
27	McGovern, 2011	66	Turner and Davila-Ross, 2015	**2021**	
28	Sawano, 2011	67	Zacharova et al., 2015	104	Cranney and Morris, 2021
29	Sokol and Kuebli, 2011	**2016**		105	Freedman et al., 2021
30	Takooshian and Landi, 2011	68	Bringle et al., 2016	106	Harris et al., 2021
31	Trapp and Akhurst, 2011	69	Coulson and Homewood, 2016	107	Horn et al., 2021
32	Trapp et al., 2011	70	Cranney et al., 2016	108	Newell et al., 2021
33	White, 2011	71	Heritage et al., 2016	109	Pownall et al., 2021
2012		72	Murdoch, 2016	**2022**	
34	Bryan et al., 2012	**2017**		110	Bringle et al., 2022
35	Cranney et al., 2012a	73	Green et al., 2017	111	Hulme and Cranney, 2022
36	Cranney et al., 2012b	74	Hulme and Kitching, 2017	112	Luong and Butler, 2022
37	Dickson, 2012	75	Hulme and Winstone, 2017		

Q.2, "Year of publication?"; APA, American Psychological Association; NPCR, National Psychology Curriculum Roundtable; QAA, Quality Assurance Agency. Note that for 2021 and 2022 publications, sometimes these were "online first" and so may eventually be published in a different year.

TABLE 2 Paper number as a function of national identification of first author.

Nation	Paper numbers	Total	%
Australia	3, 11+, 12+, 13+, 14, 15+, 16, 17+, 18, 21, 33, 34, 35, 36, 40, 42, 43, 45, 54, 60, 63, 69, 70, 71, 73, 80, 81, 82, 84, 85, 86, 89, 97, 98, 101, 102, 104, 108.	38	33.9
USA	1, 2, 4, 5+, 6, 7, 8, 9, 19, 22, 23, 27, 29, 30, 37, 38, 39, 41, 48, 55, 56, 62, 68, 76+, 77, 83, 92, 96+, 99, 105, 110+	31	27.7
UK	31, 32, 44, 46, 47, 49, 50, 51, 52, 53, 57, 58, 61, 64, 65, 66, 74, 75, 78, 79, 87+, 88, 91, 93, 94, 95, 100, 106+, 109, 111+	30	26.8
Canada	10, 59, 72, 112	4	3.6
Aoteora New Zealand	20, 24	2	1.8
Slovakia	67, 103+	2	1.8
Other	Austria 90, Germany 106, Indonesia 28, Italy 25, Russia 26	5	4.5

Q.4, "What is the national identification of the first author (e.g. USA, UK, Australia, Indonesia, Italy)"; Q.5, "Is this a multi-national co-authored paper" (this is indicated by "+").

TABLE 3 Paper number as a function of paper/publication type (Q.6).

Publication type	Paper numbers	Total	%
Chapter	4, 5, 8, 9, 10, 12, 13, 14, 15, 16, 17, 18, 19, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 33, 34, 36, 38, 41, 43, 54, 55, 56, 62, 78, 80, 81, 85, 86, 88, 97, 98, 101, 103, 104, 110, 111	47	42.0
Journal article	1, 2, 20, 40, 42, 45, 49, 50, 51, 52, 53, 57, 58, 59, 61, 63, 65, 66, 69, 71, 72, 73, 74, 75, 76, 77, 79, 82, 83, 89, 90, 91, 92, 100, 102, 105, 106, 107, 108, 109, 112	41	36.6
Report	3, 6, 32, 35, 39, 44, 46, 47, 70, 93	10	8.9
Other	7, 36, 48, 60, 64, 87	6	5.4
Book	68, 84, 96, 99	4	3.6
Proceedings	67, 94, 95	3	2.7
Edited book	11	1	0.9

Q.6, "Type of paper?". To the best of our knowledge, all paper types are peer-reviewed, except for "Other".

listings). Some of these papers will be discussed in the interim summary below.

What is the prevalence of papers that conceptualize PL as a general capacity compared to a group of capacities?

Table 4 indicates that approximately half the papers mentioned PL as a general capability, whereas there appear to be more papers that mention PL as a group of capabilities. Note that this is not an either-or situation; 45 papers (40.9 %) mentioned both conceptualizations. For PL as a *general* capability, many cite Cranney et al. (2012a); however there is some variability, occasionally with specific reference to education. For example, Amsel et al. (2014) described PL as "the integrated set of disciplinary attitudes, knowledge, values, beliefs, and skills which can be acquired through training and adaptively used to solve real world life and community problems" (p.1). The variety of ways in which PL has been defined as a *group* of capabilities is illustrated by Newell et al. (2021).

What is the prevalence of papers that refer to the terms psychologically literate citizen, psychologically literate global citizen, or global citizen?

Table 4 indicates that over half of the papers mentioned at least one of these "citizen" terms. Thus, it can be concluded that PL is relatively strongly associated with this term.

Interim discussion

In terms of the ratings (1 [minimal] to 5 [significant]) of contribution to the conceptual understanding of PL (Q.7), amongst the 5-rated papers, McGovern et al. (2010) was identified in the Introduction as a key conceptual paper to which the majority of subsequent PL papers refer. The paper refers to PL as the *group* of nine graduate capabilities that all undergraduate psychology major students should acquire: "having a well-defined vocabulary and basic knowledge of the critical subject matter of psychology; valuing the intellectual challenges required to use scientific thinking and the disciplined

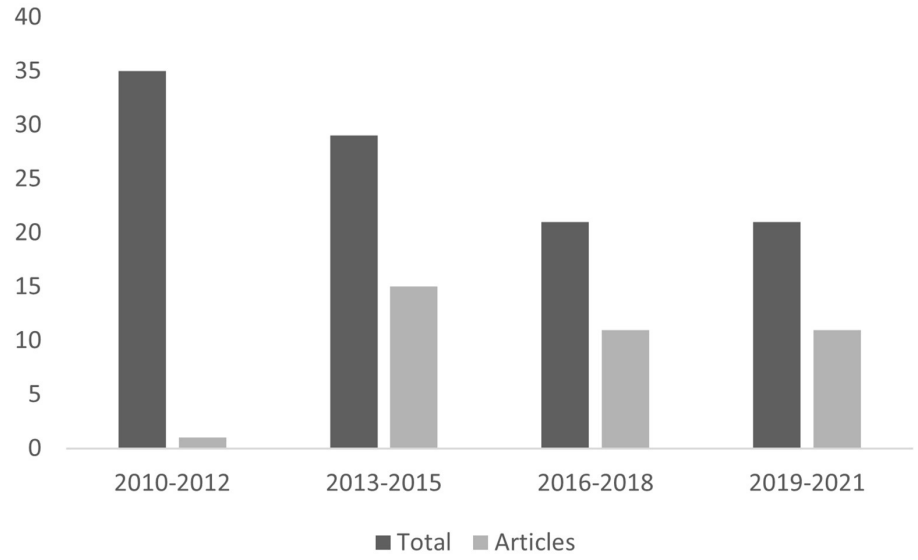

FIGURE 2
Total number of papers, and number of journal articles, as a function of time period.

TABLE 4 Paper number as a function of type of psychological literacy (PL) definition mentioned, whether "citizen" was mentioned, whether relevant to measurement, and whether mentioned PL as a unifying concept.

Question	Paper numbers	Total	%
Q8: General	1, 8, 11, 12, 20, 34, 35, 36, 39, 40, 41, 43, 44, 45, 46, 48, 49, 51, 53, 54, 55, 56, 57, 58, 60, 61, 63, 65, 69, 70, 71, 72, 73, 74, 75, 78, 80, 81, 82, 84, 86, 87, 88, 91, 94, 95, 96, 97, 98, 100, 102, 103, 104, 105, 106, 107, 108, 109, 111	59	52.7
Q9: Group	3, 5, 6, 7, 9, 10, 11, 12, 13, 15, 16, 17, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 35, 36, 40, 41, 43, 44, 45, 46, 48, 51, 52, 53, 54, 55, 56, 57, 58, 60, 61, 62, 63, 65, 66, 69, 71, 72, 73, 75, 76, 78, 79, 80, 82, 83, 86, 87, 88, 89, 90, 93, 95, 96, 97, 98, 99, 102, 104, 106, 107, 108, 109, 111	78	69.6
Q10: Citizen	3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 17, 18, 19, 21, 22, 23, 24, 25, 27, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 41, 42, 43, 44, 46, 47, 48, 49, 51, 53, 54, 55, 57, 58, 61, 63, 64, 65, 68, 69, 72, 74, 78, 82, 83, 85, 87, 88, 90, 96, 97, 102, 104, 106, 107, 109, 110, 111	68	60.7
Q.19: Measurement	40, 41, 45, 48, 52, 63, 71, 72, 83, 86, 95, 102, 106, 108	14	12.5
Q.23: Unifying Paradigm	5, 35, 75, 78, 79, 83	6	5.4

Q.8, "Does this paper conceptualize PL as a general capability (e.g., PL, capacity to apply psychology to achieve personal, professional, and societal goals)"; Q.9, "Does this paper conceptualize PL as a group of separate capabilities? (e.g. knowledge, research methods, values and ethics, critical thinking, communication)"; Q.10, "Does this paper (regardless of how it conceptualizes PL) include the notions of "global citizen" and/or "psychologically literate citizen" and/or "psychologically literate global citizen?"; Q.19, "Does this paper significantly address the measurement of PL (other than primarily the in-program/course/unit assessment)? [Such measurement could have the potential to be applied to almost any population (e.g., general population samples) and in almost any context. That is, such measurement may not necessarily be attached to any formal assessment but could be used, for example, to index changes in PL as a result of an educational intervention within formal or informal educational contexts. It could take many forms, for example, a scale or a battery of scales or behavioral tasks, or an expert assessment (e.g., of whether a person is psychologically literate, on the basis of their behavior)]"; Q.23 = "Does this paper refer to PL as a unifying/integrative paradigm for psychology (eg across education, research, practice, outreach)".

analysis of information to evaluate alternative courses of action; taking a creative and amiable skeptic approach to problem solving; applying psychological principles to personal, social, and organizational issues in work, relationships, and the broader community; acting ethically; being competent in using and evaluating information and technology; communicating effectively in different modes and with many different audiences; recognizing, understanding, and fostering respect for diversity; and being insightful and reflective about one's own and others' behavior and mental processes" (p. 11).

As noted in the Introduction, McGovern et al. (2010) also makes the first reference to the term PLC, which is framed as building upon but distinct from PL. Cranney and Dunn's (2011a) edited book included the remit to authors to refer to the McGovern et al. (2010) chapter. In the first chapter, Cranney and Dunn (2011b) refer to McGovern et al.'s *group*

of graduate capabilities, but also define PL in a *general* way as "psychological knowledge that is used adaptively" (p.8). These authors also argue that "psychologically literate citizens use their psychological literacy to solve problems in an ethical and socially responsible manner in a way that directly benefits their communities" (p.10). Murdoch (2016) defines PL in a *general* way as the "ethical application of psychology knowledge and skills" (p.189), but he also defines PL as a 'meta-literacy' whereby there are a *group* of psychology-specific graduate capabilities ("Specific psychological knowledge in the core areas of psychology; Psychology-specific knowledge and skill in the generic literacies (e.g., appropriate search terms in information literacy, and double-blind methodologies); The ability to apply this knowledge and skill to personal, occupational and societal issues using the connected literacies and skills"; p.191), as well as a number of generic capabilities (e.g., multicultural literacy, scientific literacy, critical thinking). He views McGovern et al.'s concept of PLC favorably, but in need of further development, particularly in terms of including non-Western perspectives.

In summary, the "*group*" conceptualizations are closely tied to consideration of what psychology major students should acquire during their program, including the generic capabilities (although as argued by Murdoch, 2016; there are psychology-specific aspects of these). Cranney et al. (2022a,b) have recently proposed, for international discussion, a number of "core" PL capabilities (knowledge, including skills; research methods; application to personal, professional, and community domains) and generic (but informed by psychological science) capabilities such as communication and cultural responsivity.

In contrast, it could be argued that the "*general*" definition of PL is not necessarily tied to a particular level of formal education, and indeed, could be acquired informally, as long as there is understanding of theory and research that underlies that particular aspect of PL [see Cranney and Morris (2021), for a framework for understanding this notion[2]]. It could be argued (as did one of our peer-reviewers) that the term "psychology" directly names the formal discipline and profession of psychology, whereas "psychological literacy" should be acquired by all of our graduates, but also may be acquired through informal education, to the benefit of the general public, as elaborated in the last paragraph of Section What is the prevalence of PL papers that have relevance to education, and what is the distribution across different levels/domains of education?. The reviewer offers "digital literacy" as an analogy: through their formal education and training, computer and digital scientists are digitally literate, however we also expect that any person using a digital device has some level of digital literacy. Others may argue that some theoretical knowledge underlying skill is essential to the semantically correct use of the term "literacy" (Cranney and Dunn, 2011b; Cranney and Morris, 2021).

An additional point made by both Cranney and Dunn (2011b) and Cranney and Morris (2021) is that no one person would be highly competent in applying knowledge/skills/attitudes in all areas of psychology; nevertheless "psychological literacy implies a relatively well-integrated and functional set of schemas that across individuals may show some variability in expression, but in terms of central tendency, can be recognized and assessed as 'psychological literacy'" (Cranney and Dunn, 2011b, p.8). These schemas could reflect integrating themes such as those recently identified in the APA Introductory Psychology (IP) Initiative, including "Psychological science relies on empirical evidence and adapts as new data develop"; "Our perceptions and biases filter our experiences of the world through an imperfect personal lens"; and "psychology values diversity, promotes equity, and fosters inclusion in pursuit of a more just society" (APA, 2021; Gurung and Neufeld, 2022).

An extension of the conceptualization of PL is demonstrated by one of the 5-rated papers (Hulme and Winstone, 2017), and many of the 4-rated papers. Essentially, an educator who accepts that psychological literacy should be the outcome of psychology education (at whatever level) should be psychologically literate themselves. As we discuss in the Education Landscape section, this includes using evidence-informed teaching strategies, as well as other aspects of modeling PL for students. Like the papers on cultural responsiveness (e.g., Coulson and Homewood, 2016; Dudgeon et al., 2018), this aspect of PL is quite complex but, we would argue, worth aspiring to.

Some argue that PLC is also an extension of the concept of PL; but we treat it as worthy of consideration in its own right (for excellent discussions leading to the same conclusion, see Harre et al., 2011; Trapp and Akhurst, 2011; Mair et al., 2013; moreover; Job et al., 2011 argue that PLC is a process, not an outcome). A very recent paper gives a general definition of PL as the "intentional values-driven application of psychology Knowledge to achieve personal, professional, and community goals" (Cranney et al., 2022a; p.3). That is, PL is seemingly values-neutral: one could use one's psychological knowledge and skills (a) to achieve highly individualistically oriented goals, or (b) for the "common good" as reflected in community welfare goals (Sokol and Kuebli, 2011). However, while one could argue that the definition of PL is "values neutral", the definition of PLC is weighted more toward "community welfare". McGovern et al. (2010) did emphasize the "global" aspect of PLC, and Charlton and Lymburner (2011) made this more explicit with their term "psychologically literate global citizen", and argued that "although the development of a global… citizen is obviously a multidisciplinary pursuit, psychology as a discipline is particularly well suited to this

2 Essentially, Cranney and Morris (2021) make a distinction between two dimensions – having the theoretical knowledge underlying psychological skills and attitudes (or not), and using/applying psychological knowledge/skills/attitudes (or not). Psychologically literate individuals are high on both dimensions.

task" (p.234). Although (a) Cranney et al. (2022a,b) make a broad distinction between local, national/regional, and global communities, and (b) one's community-related goals could focus more on a single community domain, in this paper for the sake of simplicity we treat the terms PLC and PLGC as equivalent. The transdisciplinary concept of global citizenship (GC) has been defined as involving "the understanding of global interrelatedness, and the capacity to live, work and contribute positively as a member of global communities" (Cranney et al., 2012a; p.iii). Clearly, GC can be acquired by various transdisciplinary routes. A possible way to think about this trans-disciplinarity and the relationships amongst these various concepts is proposed in Figure 3.

What is the prevalence of papers that address the measurement of PL?

Table 4 presents the data relevant to PL measurement, which is closely tied to consideration of definitions of the concept of PL. As Roberts and Gasson (2018) point out, PL can be measured in the educational context through formal assessments; however, the capacity to measure PL in any situation and with any population could also be useful in terms of measuring the impact of "giving psychology away" (Miller, 1969) in formal *and* informal (e.g., public) settings. Nevertheless, graduate employers apparently are less interested in the latter form of measurement (McGovern et al., 2010). The measurement of PL has usually taken a *group* definition approach, with different measurement instruments for different capabilities, usually attempting to measure at least some of McGovern et al. (2010) capabilities. Attempts by Roberts and colleagues (Roberts et al., 2015; Heritage et al., 2016) and by Burton et al. (2013) using primarily student self-report measures produced more than one factor, whereas Amsel et al. (2014), using student performance measures, produced a single factor. Subsequent reviews by Newell et al. (2020, 2021) have questioned the validity of the student self-report measures; indeed, measures that take curricular input variables (i.e., teaching strategies) into account may be needed in order to increase measurement validity. Very recently, and not analyzed in this review, Machin and Gasson (2022) describe the ongoing development of the scenario-based Test of Psychological Literacy – Revised (ToPL-R), whereby the:

> "…scoring process [is] based on the Situation Judgement Test (SJT) methodology… Similar to a multiple choice question, respondents are presented with five possible answers to each scenario, each of which has been rated by experts as to how 'correct' it is. By using a multiple choice style response format, the test can be completed in less time and scored electronically, making it fit for purpose (i.e., able to quickly and accurately assess psychological literacy)" (p. 21–23).

As highlighted by a peer-reviewer, a further gap in this measurement research is longitudinal studies across educational programs and further professional training, which could yield rich data for further conceptual development. In summary, more innovative research is required in this area, and both longitudinal studies and ToPL-R provide promising future directions.

How prevalent are papers that consider PL as a unifying concept in psychology?

As indicated in Table 4, five papers other than McGovern et al. (2010) make reference to this idea. Cranney et al. (2012a) stated that "our aim was to have stakeholders understand each others' diverse needs at the same time as encouraging them to collaboratively progress a future-oriented agenda for our students, our discipline and profession, and our world (primarily through drawing on the concept of psychological literacy)" (p.23). Three papers (Hulme and Winstone, 2017; Winstone and Hulme, 2017; Winstone and Kinchin, 2017) strongly argue that psychological literacy is an integrative concept in psychology, primarily because (a) adopting psychological literacy as a pedagogical philosophy (teaching approach) necessarily requires educators to role-model being psychologically literate in their educational practice, a process which promotes both the science and practice of psychology, and in doing so, (b) educators are more likely to produce graduates who are psychologically literate, and capable of promoting psychological science and practice in their diverse communities, thus both unifying and benefiting the discipline and profession of psychology as a whole. As Hulme and Winstone (2017), p.264; argued, "… the discipline of psychology… has a clear integrative disciplinary concept, that of psychological literacy… which unites the discipline (i.e., what is to be taught) with pedagogy (i.e., how it should be taught)". Landrum and McCarthy (2018) further highlight the potential for PL as a unifying concept in psychology:

> "Our undergraduate pipeline is the key to our discipline's future, for the advancement of science, the practice of the profession, and in the public interest. Psychology educators should strive to create intentional learners... Intentional learners adapt to new environments, use methods of inquiry to integrate data from multiple sources, and foster lifelong learning. Intentional learners become empowered through the acquisition of knowledge and demonstration of skills, and they become informed about the world by using multiple forms of inquiry, and become responsible for their personal behavior and espouse civic values. Whether the label be intentional learners or the psychologically literate, attainment of these goals is too important to leave to chance." (p.60).

The authors of all these papers were affiliated with native English language nations, and as noted elsewhere in this review, this idea of PL as a unifying concept in psychology may be challenged when scholars from other cultural traditions contribute robustly to this debate. Indeed, the relevance of this idea has already been challenged in the peer-review process for this paper, for example: How relevant is the concept of PL to graduate psychological scientists focusing on very narrow topics of research, or to graduate regulated psychological practitioners in specific areas of specialization? Our answer to these constructive criticisms lie in the common foundational PL capabilities (see also the General Discussion section), that, for example, (a) lead psychological scientists to share their findings with the general public through the use of evidence-based communication strategies (building, e.g., on their foundational communication, values & ethics, and application to the community domain capabilities), and (b) lead members of different psychological practice specializations to respect, rather than denigrate each other's certified capabilities (building, e.g., on their foundational cultural responsivity and values & ethics capabilities). Such psychologically literate behaviors (resulting from foundational education) should contribute to the public perception of psychology as a unified and credible discipline and profession, with multiple benefits to many stakeholders.

PL education landscape

What is the prevalence of PL papers that have relevance to education, and what is the distribution across different levels/domains of education?

All papers were judged to have relevance to education (Q.11: "Is this paper particularly relevant to psychology education (ie at least 50% of content)?"). This is not surprising, given the focus of Boneau (1990) and McGovern et al. (2010) on undergraduate psychology education. Papers contributing to the case for PL as an outcome for psychology education are summarized in Morris et al. (2021). Although not scored in this study, it became apparent that all papers were aimed at an educator audience, except for three: Bernstein et al. (2020) is a first-year psychology text book; Dunn and Halonen (2020) provides career advice to psychology major students; and Morris et al. (2018) book describes the psychological science of many self-management tools, and is accessible to the public but also used as a text book for undergraduate students. The distribution of papers across the different levels of education is apparent in Table 5, with the majority of papers being relevant to the undergraduate domain. Only 10 papers (9.1%) covered more than one education level.

PL is particularly relevant to pre-tertiary psychology education. In their review of pre-tertiary education in Europe, Sokolova and Williamson (2020) state that one of the aims of the European Federation Psychology Teachers Association is to "increase psychological literacy across the nation" (p.343). National Psychology Curriculum Roundtable (NPCR) (2015) proposes an Australian curriculum which features PL. Hulme (2014) argues that for both pre-tertiary and undergraduate psychology education, emphasizing PL development enables adaptive application to the real world of diverse and changing career destinations; multiple curricular examples are provided. The key role of pre-tertiary education in the conceptualization of PL and in the appreciation of psychology by the general public is considered further in the General Discussion section.

At the undergraduate level, the scientific literacy aspect of PL is illustrated by Pownall et al. (2021) description and evaluation of a blog-writing assessment which "fosters psychological literacy by encouraging students to engage with the interplay between subject knowledge and real-world applications" (p.1). Illustrating the professionalism domain of PL is Hamilton et al. (2018) who, as summarized by Morris et al. (2021), "provide a compelling, research-based rationale for offering psychology major students a work-integrated learning (WIL) or service learning experience, and then review the current literature on these strategies" (p.13; see also Reddy et al., 2013). Bringle et al. (2016, 2022) provide a comprehensive theoretical and practical coverage across the undergraduate curriculum of service learning strategies for PLC development.

At the graduate level, Green et al. (2011) argue that graduate programs in positive psychology contribute toward greater PL and GC. Nissley and Atwood (2015) argue for PL as a teaching approach, and they propose specifically that in the early years of graduate training there should be a greater emphasis on application. One could argue that if all psychology major students acquired a moderate level of PL, then graduate training would involve acquiring a more advanced level of PL in a particular specialization (e.g., clinical, community, forensic, sports). The current lack of publications at the graduate level may reflect graduate educators' lack of awareness of, or lack of explicit focus on, this concept.

The moderately large number of papers addressing PL at an interprofessional level illustrates the relevance of psychology to education/training in multiple disciplines/professions - unsurprising given psychology's "hub" disciplinary status (Boyack et al., 2005). This is an area full of intriguing challenges and opportunities, as Morris et al. (2021) illustrate in their summary of papers in this area. For example, Pusateri et al. (2019) argue against Department of Psychology educators delivering tailored psychology content into training programs for other professions, given (a) the too-high resource implications, and (b) mainstream psychology units oriented toward developing PL would necessarily deliver useful graduate capabilities relevant to all professions. Perhaps in contrast to Pusateri et al. (2019) argument, (a) Horn et al. (2021) describe how a German teacher training program productively adopts a PL teaching and outcome approach (similarly, see Zacharova et al., 2015), (b) Martin et al. (2020)

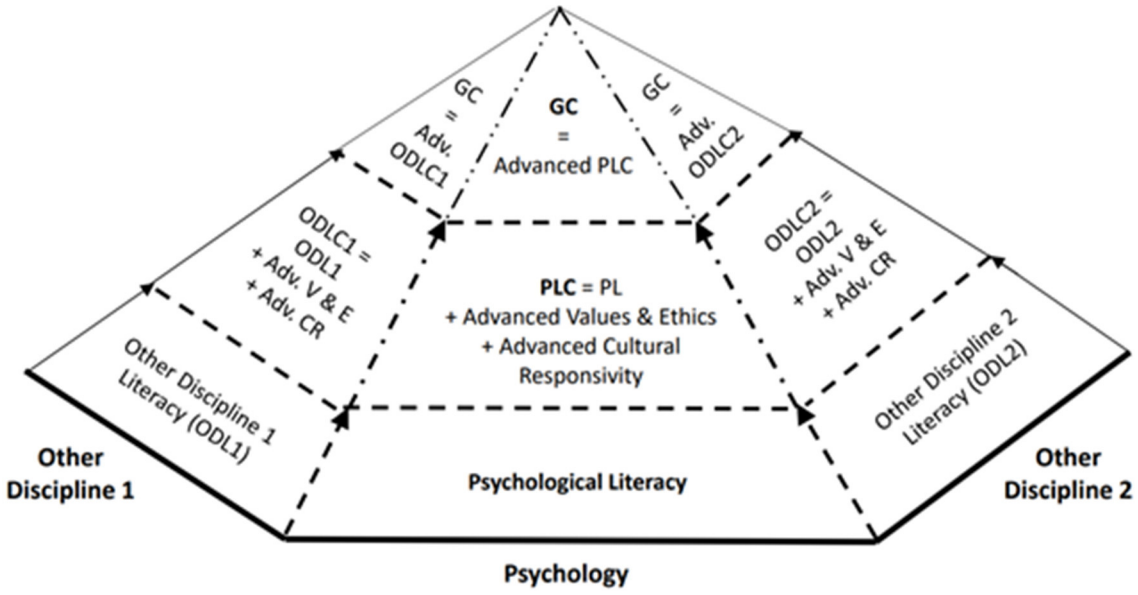

FIGURE 3
A proposal as to how psychological literacy (PL) relates (a) to the concept of psychologically literate citizenship (PLC; for simplicity's sake, this concept is considered here to be equivalent to the concept of psychologically literate global citizenship), and (b) to the concept of global citizenship (GC). The trajectory from PL through PLC to GC necessarily involves increased interaction (indicated by more open boundaries) with at least one 'other-discipline literacy' (ODL) and that discipline's parallel potential development into the concepts of "other-discipline literate citizenship" (ODLC) and GC. Two ODL's are depicted here; but of course there are multiple ODLs that PL would interact with. GC is characterized by a deep appreciation of and respect for other disciplines/professions, reflected in very high levels of CR and V&E. Adv, Advanced; CR, Cultural responsivity; V&E, Values & Ethics.

describe how knowledge from psychological science benefits the undergraduate training of researchers from all science disciplines, and (c) Cranney and Morris (2021) describe integrating psychological science informed self-management capability building in units from any discipline. Regardless of how PL is developed during the training of other professionals, this plays a key role in Miller (1969) argument that psychological scientists and educators should "give psychology away" (p. 1071).

There are relatively few public education papers but nevertheless more so than at the graduate level. Most of these education-focused authors have a "big picture" awareness of the potential public good that should result from a more psychologically literate public. For example, Sawano (2011) describes media-based public education in Indonesia, and Morris et al. (2018) describe a set of evidence-informed tools for self-management in a way that is accessible to the general public. Both Cranney et al. (2012b) and Banyard and Hulme (2015) argue for the central role of pre-tertiary and undergraduate psychology in developing the PL of the general public, both because the large number of such graduates constitute a sizable proportion of the general population, and because of the informal educational "ripple effect" such graduates may have in their communities. Luong and Butler (2022) test a brief educational intervention designed to reduce fundamental attribution error in a general public sample. Clearly more direct public education approaches (such as described by Sawano, 2011) are required. Peak psychology discipline/professional bodies have the resources available to play a direct central role in increasing PL in the public domain through public education, with multiple potential benefits including increased support for the discipline and profession of psychology, and increased psychological health in the general population.

How prevalent are papers that provide educators with practical teaching and assessment strategies for PL?

Table 5 presents the data relevant to teaching and assessment strategies. Although there are more papers that cover teaching than assessment strategies, overall there are sufficient papers to allow educators to adapt the described strategies to their own programs and units. Excellent starting points are Mair et al. (2013), the two Taylor and Hulme (2015a, 2018a) compendia and Hulme and Cranney (2022), each of which contain multiple examples. One of the pioneering programs that utilized active learning, scaffolding, collaborative learning and authentic assessment in developing PL was at the University of Stirling, as described by Watt (2013) – a source of inspiration for all psychology educators. Nevertheless, as Cranney et al. (2022a,b)

TABLE 5 Paper numbers as a function of level of education, and as a function of teaching and assessment strategies.

Question	Paper Numbers	Total	%
Q12: Pre-tertiary	36, 49, 51, 57, 60, 90, 103	7	6.3
Q13: Undergraduate	1, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 29, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 50, 51, 52, 54, 55, 56, 57, 58, 61, 63, 64, 65, 66, 68, 69, 70, 71, 72, 73, 74, 75, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 93, 94, 95, 96, 97, 98, 99, 100, 102, 104,105, 106, 108, 109, 110, 111	95	84.8
Q14: Graduate	21, 62	2	1.8
Q15: Inter-professional	28, 59, 67, 91, 92, 94, 97, 101, 104, 107	10	8.9
Q16: Public education	11, 28, 36, 53, 84,112	6	5.4
Q.17: Teaching	3, 8, 9, 10, 11, 13, 14, 15, 16, 18, 19, 21, 22, 23, 24, 25, 26, 29, 31, 32, 33, 34, 36, 37, 39, 40, 43, 44, 46, 47, 50, 51, 52, 54, 55, 57, 58, 60, 62, 64, 65, 66, 67, 68, 69, 70, 72, 73, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 90, 92, 93, 94, 96, 97, 98, 100, 101, 104,105, 107, 109, 110, 111,112	78	69.6
Q.18: Assessment	3, 8, 9, 11, 13, 15, 23, 34, 39, 41, 43, 46, 47, 54, 55, 58, 61, 64, 65, 66, 68, 78, 80, 83, 85, 86, 87, 88, 93, 98, 104, 107, 109, 110, 111	35	31.3

Q.12–16 general question stem = "Is this paper particularly relevant to [xxx] psychology education (i.e. at least 25% content)?"; Q.17: "Does this education paper have worthwhile information regarding in-program/course/unit teaching strategies for PL (i.e. that would be of significant use to educators)"; Q18: "Does this education paper have worthwhile information regarding the in-program/course/unit assessment of PL (i.e. that would be of significant use to educators)".

point out, there may be particular PL capabilities, such as communication, that require more effective teaching strategies and more objective assessments – this may require more innovative student partnership and technological solutions.

How prevalent are papers that address PL as a pedagogical philosophy, with its various aspects?

Data relevant to PL as a pedagogical philosophy are presented in Table 6. Note that responses to Q21 and 22 are contingent on a "Yes" response to Q.20. Seventeen papers were rated "Yes" for both Q.21 and 22, and we give some brief examples mostly from this subgroup; however, see Morris et al. (2021) for an overview of some relevant papers. McGovern et al. (2010), p. 14; provide a list of faculty characteristics that are part of program quality benchmarks for PL (see also APA, 2011; McGovern, 2011). Bernstein (2011) notion of a scientist-educator includes two aspects of PL as a pedagogical philosophy: a commitment to PL as the desired outcome of psychology education, and the adoption of evidence-based teaching strategies (see also Dunn and McMinn, 2015; Cranney and Morris, 2021). Both Mair et al. (2013) and Hulme and Cranney (2022) provide a strong rationale for adopting PL as a pedagogical philosophy, and also provide multiple examples including program-level approaches.

Hulme and Winstone (2017) build on the notion of PL as an integrative disciplinary concept by explaining how professional values (evidence-based practice; acting ethically; professional competence) lead educators to take a risk-management rather than risk-averse approach to pedagogical innovation. The authors model PL by using McGovern et al. (2010) PL capabilities to illustrate how educators can safely and ethically approach (in a values-driven way) innovation to support the development of PL in their students.

> "Within psychology…we believe that a psychologically literate teacher is one who is well equipped to deliver innovative teaching that is creative and moves the discipline forwards, and can practice within the bounds of their competence within a given educational context. This may, of course, require professional development and scholarship on the part of the educator, to stretch the bounds of their competence, and this too, draws upon the psychological literacy skills of the teacher. Thus psychological literacy might effectively act as a safety net to reassure the teacher during times of uncertainty… Perhaps the best strategy… to foster innovation, is to prioritize the development of psychological literacy and its delivery within our academic community" (Hulme and Winstone, 2017, p. 272)

This in-depth critically reflexive approach to the development of one's professional practice in guiding students toward the acquisition of PL parallels the work of McGovern (2011) and of those authors espousing the centrality of cultural responsivity (e.g., Coulson and Homewood, 2016; Dudgeon et al., 2018). In the next section, we present a renewed perspective on how educators can support the development of PL.

TABLE 6 Paper numbers as a function of aspects of psychological literacy (PL) as a pedagogical philosophy (PP).

Question	Paper numbers	Total	%
Q.20: PL as PP	5, 6, 8, 9, 10, 11, 12, 13, 15, 16, 18, 19, 23, 27, 29, 30, 31, 33, 35, 36, 37, 38, 40, 41, 42, 43, 44, 46, 50, 51, 54, 55, 56, 57, 58, 61, 63, 65, 66, 67, 69, 72, 73, 75, 77, 78, 79, 80, 81, 87, 88, 92, 94, 97, 98, 103, 104, 105, 106, 108, 110	61	54.5
Q.21: Evidence-informed Teaching	5, 6, 8, 11, 35, 36, 37, 38, 42, 43, 44, 46, 50, 51, 56, 57, 61, 67, 72, 75, 78, 83, 97, 98, 104, 106, 110	27	24.1
Q.22: Modeling PL	5, 6, 8, 9, 10, 11, 13, 16, 18, 27, 37, 42, 44, 46, 50, 51, 56, 57, 61, 65, 75, 78, 79, 88, 97, 110	26	23.2

Q.20, "Does this education paper address PL as a pedagogical philosophy (which assumes that PL is the intended outcome of the education)"; Q.21, "Does this Pedagogical Philosophy paper refer to PL as a pedagogical philosophy in terms of educators having an evidence-informed teaching orientation"; Q.22, "Does this Pedagogical Philosophy paper refer to PL as a pedagogical philosophy in terms of educators 'modeling' PL in practice (beyond an evidence-informed teaching approach)".

General discussion

In this section we (a) briefly summarize the answers to the questions posed in this review; (b) discuss some key implications, (c) discuss the limitations of the study, (d) present a perspective on how psychologically literate graduates emerge from psychology education, (e) consider the vital role and outcomes of introductory psychology, and (f) provide recommendations for future work regarding PL and psychology education.

General PL Landscape:

- There is moderate internationality and some collaborative internationality in the PL literature, but there is room for improvement, despite taking into account that only English language papers were included in this review.
- Publication type is heterogeneous, with an insignificant increase in journal articles across the years; total number of publications have not changed significantly over the four time periods examined.

PL Conceptual Landscape:

- A number of papers that have made key conceptual contributions were identified and briefly described.
- A substantial number of papers (52.7%) made reference to PL as a general capacity, and even more (69.6%) made reference to PL as a group of capacities.
- A substantial number of papers (60.7%) made reference to the terms psychologically literate citizen, psychologically literate global citizen, or global citizen; a model for the interrelatedness amongst these concepts is proposed.
- There are relatively few papers (12.5%) that address the measurement of PL (other than through formal in-curricular assessment), and this is identified as a gap in the PL literature.
- There are a few papers (5.4%) that explicitly discuss PL as a unifying concept in psychology.

PL Education Landscape:

- All papers had relevance to education, with the greatest proportion of papers relevant to the undergraduate level (84.8%) and the least to the graduate level (1.8%).
- There are a substantial number of papers that provide educators with practical teaching (69.6%) and assessment (31.3%) strategies for PL.
- There are a substantial number of papers (54.5%) that address PL as a pedagogical philosophy, including the facets of evidence-informed teaching (24.1%) and (otherwise) role-modeling PL (23.2%).

In terms of implications, although significant work has been undertaken in the conceptual development of PL, further research and policy work is required to reach consensus amongst international educators and researchers. This will allow more precise operationalization and measurement, whether such measurement is through instruments that can be applied to any population, or through formal assessment in educational contexts. The *general* definition by Cranney et al. (2022a,b) of PL as the "intentional values-driven application of psychology Knowledge to achieve personal, professional, and community goals" (p. 3), can be contrasted with the *group* definition consisting of: knowledge (including skills); research methods; application to personal domain; application to professional domain; application to community domain; communication; critical thinking; values & ethics; and cultural responsivity. The first five are the core discipline capabilities; the last are generic capabilities that are deeply contextualized to psychology, including being informed by psychological science. Most importantly, the paper is a provocation that argues for international consensus-seeking regarding psychology education outcomes, particularly at undergraduate and pre-tertiary levels. Relatedly, significant work is being undertaken in the area of PL as a pedagogical

philosophy, with the challenge being to provide educators with opportunities to develop this promising practice.

Limitations of this research include the restriction to English language papers and it is noted, for example, that the term has long been used, with a somewhat different meaning, in Russian psychology education (Karandashev, 2011). We invite scholars in different cultures and in non-English-language speaking countries to engage with this Anglo-American analysis of PL, and to challenge and enrich our thinking about the concept. Also excluded by applying the criterion of "culturally different meaning of psychological literacy" was a paper by Cotter et al. (2021), because it describes a "system" (rather than individual) as psychologically literate. As Morris et al. (2021) described:

> "Cotter, a psychologist, led his multidisciplinary co-author team at a mental health hospital to use evidence-based psychological interventions (including relational, emotional and problem-based coping strategies, and positive psychology interventions) to support front-line staff during the initial COVID-19 emergency. Essentially the psychologist is using his psychological knowledge and skills to change organizational behavior (what he refers to as the "psychological literacy" of the 'system')" (p. 18).

However, it could be argued that what Cotter et al. (2021) described in this paper was PL-in-action, as orchestrated by the psychologist's integration of evidence-based psychological strategies into the workplace, in order to deal with the extreme demands on staff during this stressful time. That is, any employee with appropriate psychological training should be able to flexibly apply psychological strategies in their workplace, to optimize human functioning in usual or unusual situations – thus displaying their psychological literacy.

Another limitation of this paper is the lag between the search strategies and the submission of the paper for publication, which meant that some[3] current in-press or recently published papers were not included in the Covidence analysis. This is reflective of the ongoing activity in this topic area. A further limitation is the potential for bias on the part of raters, and although procedures were adopted to reduce any such bias, replication by other research groups clearly would be good practice.

Significantly, the peer-review process for this paper prompted us to think more deeply about the past 14 years of work in this area. Is the "general" definition of PL *merely* one component of McGovern et al. (2010) group definition of PL, as one peer-reviewer commented? Our initial reaction was to argue that what is meant by the general definition (e.g., "intentional values-driven application of psychology Knowledge to achieve personal, professional, and community goals", Cranney et al., 2022a, p.3), is that it represents a "capstone" of all the other PL "group" capabilities. For example, one needs knowledge of research methods to evaluate a behavior change program, as well as knowledge of the target behavior and the target population (be that oneself, clients or employees, or the general public) and context-specific communication and critical & creative thinking skills, values and ethics, and cultural responsivity.

On further consideration, we realized that we have not clearly articulated that the PL "group" capabilities are "inputs" to the final "output" of general PL. There may be different patterns of emphasis on learning outcomes (as one peer-reviewer argued) at different educational levels (e.g., less emphasis on application of knowledge to the professional domain at pre-tertiary level) and in different cultures and nations (e.g., more emphasis on application of knowledge to the professional domain in some UK undergraduate programs), and so there will be some differences in what general PL "looks like" at the end of that educational program (see the argument in Section Interim discussion about variable but well integrated PL schemas; Cranney and Dunn, 2011b). In Figure 4, we demonstrate this idea in terms of Cranney et al. (2022a,b) suggested capabilities. Alternatives would be nationally agreed intended learning goals/outcomes/capabilities. Nevertheless, this alternative conceptualization could accommodate a list of internationally agreed *broad* capabilities, whereby there may be national differences in emphasis on each expected learning outcome/capability. In terms of operationalizing the "capstone" output of "general" PL, there could be several options. Firstly, operationalization could be in terms of measuring the agreed PL group capabilities (although this introduces the issue of whether we are measuring PL inputs rather than outputs). Secondly, operationalization could be in terms of measuring the IPI "themes" (APA, 2021), as representing the ways in which a psychologically literate individual should *think and behave*. However, again we encounter challenges in regards to whether this first-year level schema is well enough developed for the "standard" baccalaureate-level moderate amount of PL.

Thirdly, prompted by a peer-reviewer, we chose to draw on empirically supported motivation theories (e.g., Ryan and Deci, 2000) and the broader psychological and philosophical literature [e.g., Nussbaum (1997, 2006) notion that liberal education should lead to the capacity for constructive self-criticism, which is essential for human development and wellbeing] to re-invigorate previous conceptualizations of psychologically literate graduates of psychology education programs (e.g., Cranney and Morris, 2011; Hulme et al., 2015). Finally, for the sake of illustrative simplicity, we have chosen just two educational program/level examples; two different categories of psychology major, one "liberal education/open" psychology major, where a small percentage of graduates become professional psychologists (e.g., UK, USA), and the other "psychologist-bound", where the majority of graduates become professional psychologists (e.g., Italy; Job et al., 2011).

3 For example, Morris et al. (2021); Cranney et al. (2022a,b); Machin and Gasson (2022). Relevant points from these papers were nevertheless integrated into the discussion.

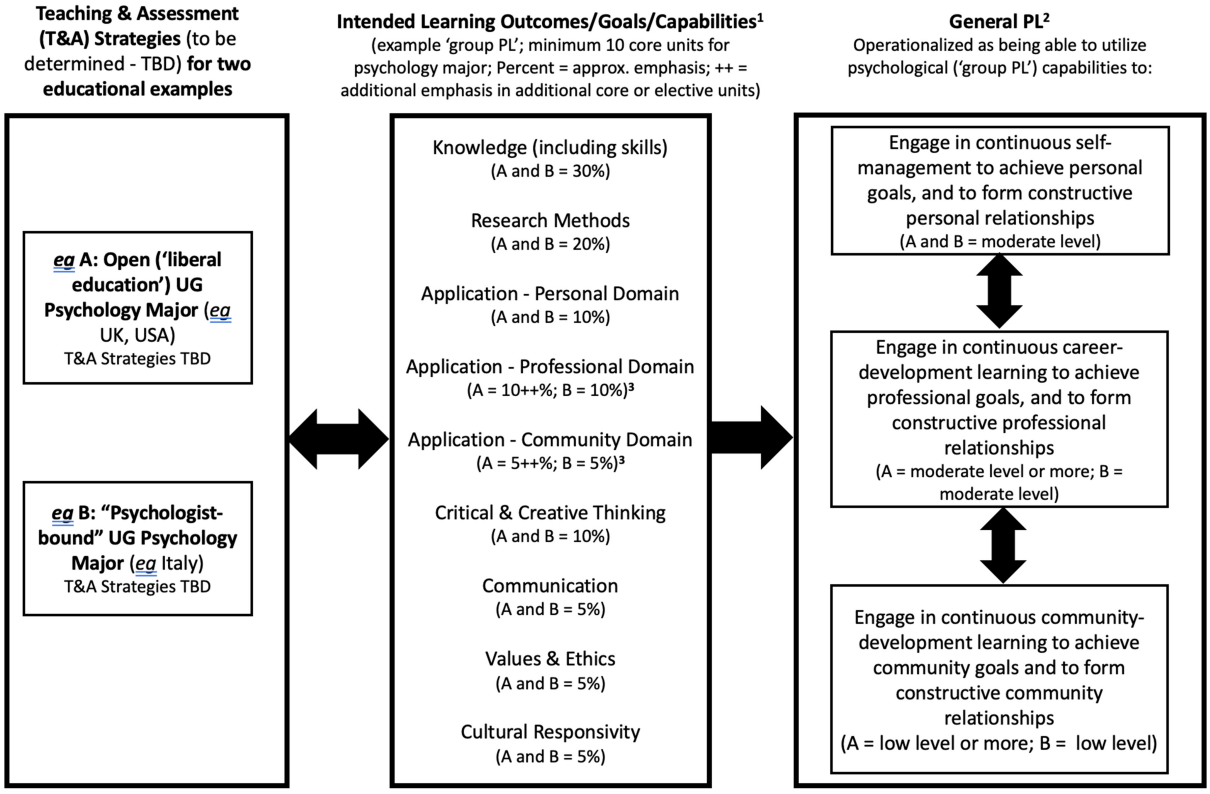

FIGURE 4
General Psychological Literacy (PL) as the Outcome of Example Psychology Major's Teaching and Assessment Strategies that are Aligned with Intended Learning Outcomes/Goals/Capabilities. #**1**. Teaching and assessment (T&A) strategies are (to be determined) inputs to the intended learning outcomes/goals/capabilities, but through constructive alignment (backward design), the T&A strategies are influenced by the intended learning outcomes/goals/capabilities, which previously have been conceptualized as "group" psychological literacy (PL), here *exemplified* by Cranney et al. (2022a,b) proposed capabilities. The final output is "general" PL (see final paragraphs of the General Discussion for emerging ideas regarding this general PL definition). The numbers are approximations of what would normally be expected for a standard undergraduate major, which we assume consists of a minimum 10 core units with additional core or elective units within a 24-unit baccalaureate degree program. Although there may be different emphases for national goals (e.g., USA – "liberal education" or "open" major - vs. Italy – where most students are "bound" to become practicing psychologists or psychological scientists), we focus here on a universal core, with variations in such national goals expressed in terms of additional core and elective units (= ++) required (e.g., see #3). The percentages in the second column are estimates only, to give the reader a sense of differences in the patterns of emphasis on different intended learning outcomes, which then influences the pattern of PL outcome. Introductory psychology units, whether at pre-tertiary or university level, would be the equivalent of one unit, and in comparison to the psychology major pattern, have greater emphasis on knowledge, and less emphasis on application to the professional domain. #**2** General PL is here exemplified by Cranney et al. (2022a), p.3; definition: "intentional values-driven application of psychology Knowledge to achieve personal, professional, and community goals". The 3 application domains of PL interact with each other (see Cranney and Morris, 2011; Cranney et al., 2022b, for further detail). A moderate level of general PL is expected after taking the minimum core psychology major units. See the final paragraphs of the General Discussion regarding new ideas regarding pre-tertiary education. #**3**. Application of Knowledge to the Professional Domain includes evidence-based employability skills (as a result of career-development learning strategies) regardless of career destination, and are essential for both types of psychology majors. The "open" major may require additional units to prepare students for more diverse career destinations and, given the liberal education tradition, one might expect the same for application to the community domain. In contrast, with "psychologist-bound" majors, there is the expectation that graduates will receive more career preparation in graduate training, and so additional units may be allocated according to local or national needs.

Essentially, we argue that there should be the same core coverage of a certain pattern of emphasis on the different learning outcomes/goals/capabilities, but that these two categories of psychology major would be distinguished by additional core or elective content. In both cases, a moderate level of general PL would be acquired. If one were to include the further example of introductory psychology (IP) at pre-tertiary or tertiary level, then the pattern of coverage of the capabilities would differ, and of course coverage would be much less, however each capability would still receive some minimal coverage, and the extent of psychological literacy acquired would be low. In terms of teaching and assessment strategies, in Figure 4, we have designated these as "to be determined", because this level of detail is beyond the scope of this paper. As indicated in the Section How prevalent are papers that provide educators with practical teaching and assessment strategies for PL?, resources already exist – these need to be categorized and aligned with the learning outcomes/capabilities.

As indicated above, the "unpacking" of the PL definition in Figure 4 draws on previous conceptualizations by Cranney and Morris (2011) and Hulme et al. (2015) who specified general domains to which psychological knowledge, skills and attitudes, acquired through education, could be applied. This notion is more fully developed in Cranney et al. (2022b), (Figure 2), whereby Bronfenbrenner (1979) model of the various socio-cultural influences on individual's thoughts, emotions, and behaviors is essentially "tipped on its head" through the "arming" of individuals with psychological capabilities. That is, through psychology education, individuals learn how to, and can choose whether to, actively influence those socio-cultural factors, rather than be passively influenced by them. These ideas are congruent with philosophical notions relating capabilities such as self-criticism to quality of life and wellbeing (Nussbaum and Sen, 1993; Nussbaum, 1997, 2006). These ideas are also congruent with Fraissl (2022) German-language analysis of the potential outcomes of psychology education, including that psychologically educated people look at everyday phenomena through the lens of their psychological training. As a result, they can behave in a more self-determined way to manage their everyday lives (see Figure 4, top component of general PL). This also is expressed in Job et al. (2011) argument regarding the benefits of PL at the individual level:

> *"Having competence and skills that allow one to fulfill a role in finding appropriate solutions to problems is likely to create positive emotions and to increase the individual's sense of self-efficacy.... That is, one's beliefs about one's capabilities to exercise influence over events that affect one's own and other people's lives. It may also foster the sense of being an agent of change rather than a passive observer..."* (p. 169).

These ideas are also congruent with the ingredients of Ryan and Deci (2000) empirically supported Self-Determination Theory. Both the group and general definitions of PL proposed by Cranney et al. (2022a,b) are motivational in nature, as reflected in the Figure 4 "unpacking" of PL. A sub-theory of Self-determination Theory proposes three psychological needs: competence, autonomy, and relatedness. The three general PL components in Figure 4 (a) reflect autonomy in choice of goal, and competence acquired through continuous learning, and (b) emphasize the importance of constructive relationships (relatedness) in all domains of our lives. Note also that the satisfaction of these basic psychological needs leads to increased wellbeing (Bahrami and Cranney, 2018). Not explicit in Figure 4 is Cranney and Morris (2011) call for psychologically literate individuals/graduates to utilize their capabilities in leadership roles in these different domains, but of course that would be each individual's choice, and it may not be until psychologically literate citizenship is acquired, that such individuals feel compelled to lead.

Finally, as a peer-reviewer constructively commented, we acknowledge that this review has been psychology-major-centric - partly understandable given the origin of the modern meanings of the term (McGovern et al., 2010). The vast majority of high school and university/college students' exposure to the discipline of psychology is through just one or two introductory psychology (IP) units, and so it is critically important for the future wellbeing of both the discipline and the general public, to promote quality outcomes of such psychology education exposure (e.g., Geiss, 2019; APA, 2021; Nolting and Geiss, 2022). There has been criticism of the typical USA-textbook-driven "*topical*" approach to the outcomes at this level, that is, a broad coverage of the various topics of "basic" (e.g., biological, cognitive, social, developmental psychology) and more "applied" topics (most commonly, psychological disorders, but sometimes also general health & wellness, organizational or forensic psychology, neuropsychology). One criticism is the fact that topic-based knowledge changes with new research findings. Alternative approaches have included the "*perspectives*" approach, which involves, for example, applying major theoretical perspectives in the field (e.g., behaviorist, biological, cognitive, evolutionary, humanistic, psychodynamic) to psychological phenomena, thus promoting transferable critical thinking skills, in the sense of being able to apply multiple perspectives in problem solving (see Nolting and Geiss, 2022, for an overview). Following a long tradition of German-language psychology textbooks and curriculum design, Nolting and Geiss (2022) present an *integrative* systems approach to IP:

> *"It is a simple fact that the scientific field of psychology can be divided into domains and topics, but this is not the case for psychology's subject matter – mind and behavior – which has to be regarded as a coherent system or organism. Therefore, when structuring a course or textbook, some kind of integration or synopsis is necessary, too. This is the primary purpose of the integrative approach"* (p. 2).

The authors provide an integrative schema (distinguishing between the outcomes of receiving/understanding and influencing/changing/acting-on, which is somewhat similar to Figure 1 of Cranney et al., 2022b) for the *common* aspects of what psychology is about. They claim that the "special benefits of the integrative pattern are (1) making the general principles more coherent, and (2) facilitating transfer to a vast range of human behavior" (p. 4). This approach holds much promise for IP, and the authors provide practical teaching examples in Supplementary material. In parallel with the development of that paper, the APA, 2021, p. 1; IP Initiative, in specifying IP learning outcomes, appears to "blend" a *topical* approach ("Psychology Content: Identify basic concepts and research findings"), a *psychological thinking* approach ("Scientific Thinking: Solve problems using psychology methods"), and an

integrative thinking approach ("Key Themes: Provide examples of psychology's integrative themes").

Similar to APA (2021) and Nolting and Geiss (2022), we argue that desirable IP learning outcomes would include: (a) understanding instructor-chosen areas within each core discipline knowledge topic, including knowledge of research methods; (b) acquisition of minimal critical thinking and scientific reasoning skills that would allow critical analysis of claims about human thinking and behavior (e.g., knowing about common cognitive biases such as confirmation bias, and the difference between correlation and causation; knowing the fundamentals of scientific approaches to the investigation of human behavior), and (c) minimal capacity to apply this knowledge and skill to solving problems (or in the motivational language of Figure 4, achieving goals). At the pre-tertiary level, this latter capacity would focus on application to the personal domain (e.g., using evidence-based strategies to deal with procrastination) and community domain (e.g., using evidence-based strategies to increase inclusivity behaviors in the high school environment). Indeed, the above three factors could be reframed as a minimal level of psychological literacy (and is somewhat congruent with the positions of Fraissl, 2022; and Nolting and Geiss, 2022), which could inform the final column output in Figure 4 (i.e., what "general" PL consists of) – but this possibility requires further collaborative research and scholarship.

Meanwhile, we should acknowledge that national and local specification of IP learning outcomes is often constrained by three factors. Firstly, there may be lack of knowledge and foresight regarding the high impact of IP; this underlines the need for those passionate about this subject to collaborate in order to influence such leaders to improve the quality of IP outcomes. Secondly, there is often a lack of adequate training of IP educators; IP advocates need to collaborate to share training and other teaching resources. Thirdly, at a tertiary level, under-funding of both undergraduate programs and graduate professional training programs may lead to psychology departments choosing to utilize IP income to fund psychology professional graduate training by offering low-cost IP topic knowledge lecture delivery and assessment, rather than more resource-intensive but deeper learning strategies (e.g., case analyses, problem-based learning, Nolting and Geiss, 2022). Again, educators must advocate for the value of IP (*and* liberal/open psychology major education at the tertiary level) and share resources. One interim practical solution may be to deliver broad introductory knowledge "cheaply" through lectures or assigned textbook or other readings (with formative quizzes and other strategies to encourage ongoing study), but within tutorial/lab settings, engage students in multiple formative and summative assessable challenges to (a) critically analyze claims about human behavior and (b) creatively solve behavioral problems (or, achieve goals) in personal or community domains, through the application of their developing psychological knowledge, skills, and attitudes (e.g., see Morris and Cranney, 2022; re. application to the personal domain).

In conclusion, we argue that one advantage of the reconceptualization of "group" PL is that it allows for *both* international consensus regarding broad intended learning outcomes/capabilities *and* national/cultural/educational-level variation on that consensus, through different degrees of emphasis on each of the "group" capabilities. Consensus regarding how to operationalize and measure "general" PL may continue to be a challenge, but that challenge again presents opportunities, such as continued international and culturally-based debate, and the known strengths of multimethod convergence (Stanovich, 2013). We invite informed comment on whether this initial revised conceptualization of PL, based on this review and provoked by peer-review commentary, adds value to the processes and outcomes of psychology education.

Recommendations:

1. To facilitate the conceptual development of PL (and thus its effective measurement/assessment) as well as the further integration of PL into psychology education as the desired learning outcome, as suggested by a peer-reviewer, international efforts are required by relevant stakeholders to reach a consensus on shared aims, intended learning outcomes/goals/capabilities, and thus practices and tools, in developing psychological literacy in formal and informal educational contexts.
2. A suggested starting point would be an international peak psychology discipline organization examining recent propositions regarding the outcomes of psychology education (particularly at the undergraduate, pre-tertiary and public education levels), and seeking consensus, in collaboration with stakeholders. Such an outcome could then trigger follow-up actions at national and institutional levels (see Cranney et al., 2022a for further suggestions). As suggested by a peer-reviewer, cultural differences in psychology education systems may translate to differences in emphasis on individual learning outcomes/goals/capabilities in those local/national educational contexts. These possibilities are accommodated by the alternative conceptualization outlined in this section (see Figure 4). The "unpacking" of the general concept of PL should also provoke further development of the operationalization and measurement of PL.
3. Consensus regarding broad psychology education outcomes should facilitate greater focus on curriculum backward design with active and explicit teaching strategies for PL, and authentic assessment and valid measurement of PL. This process could be facilitated by (a) organizational support of formal educator professional development

and sharing of practice/resources - institutionally, nationally, and internationally (including beyond English language boundaries), and (b) student partnership curricular innovation.

4. Peak national and international disciplinary organizations could take a greater role in promoting PL (and its inherent benefits for public health and wellbeing, as well as for the organizations themselves), especially through education, including public education.

Finally, O'Hara (2007) use of the term PL, although more in the vein of PLC, seems particularly relevant in our COVID-19 world, and echoes Miller's (1969) call to "give psychology away" (p.1074) to improve the human condition. As Morris et al. (2021) summarized:

> "O'Hara used "psychological literacy" to refer to an adaptive and positive application of psychology to meet the challenges of the tumultuous 21st century… [arguing] that (a) the world's population requires PL in order to deal with the rapid global cultural shifts and consequent lack of certainty in our everyday lives, and… (b) education is key to this endeavor." (p.4).

Data availability statement

The original contributions presented in the study are included in the article/Supplementary material, further inquiries can be directed to the corresponding author/s.

Author contributions

JC conceived the paper. CC managed the literature searches and the Covidence platform. JC, SM, KN, and CC contributed (in that order) to the Covidence decisions. JC wrote the initial drafts of the Sections Introduction, Results and Discussion, and Conclusions and Recommendations sections. CC and KN co-wrote the initial draft of the Method. All authors contributed significantly to the subsequent editing of the paper and approved the final submission manuscript.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

Supplementary material

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/feduc.2022.913814/full#supplementary-material

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