Validation of a credentialing assessment for overseas-educated optometrists in Australia and New Zealand

I Jalbert[1], N Chiavaroli[2], K Schmid[3], S Backhouse[4], G Phillips[5], A Cochrane[6], T McKenzie[7]

[1]UNSW Sydney; [2]Australian Council for Educational Research; [3]Queensland University of Technology; [4]Deakin University; [5]University of Auckland; [6]University of Melbourne; [7]Optometry Council of Australia and New Zealand

INTRODUCTION / PURPOSE

- Credentialing = process used to verify qualifications, experience, professional standing, and other relevant attributes of health practitioners (to determine their competence, performance, and professional suitability to provide safe, high quality health care).[1]
- Credentialing assessment for overseas-educated optometrists seeking registration in Australia and New Zealand is administered by the Optometry Council of Australia and New Zealand (OCANZ).[2]
- Candidates required to sit OCANZ's Competency in Optometry Examination (COE) (Fig 1).

Aim: To review the validation and outcomes of the written components of the credentialing assessment for overseas-educated optometrists seeking registration in Australia and New Zealand.

Can overseas-educated optometrists safely practise optometry in Australia and New Zealand?

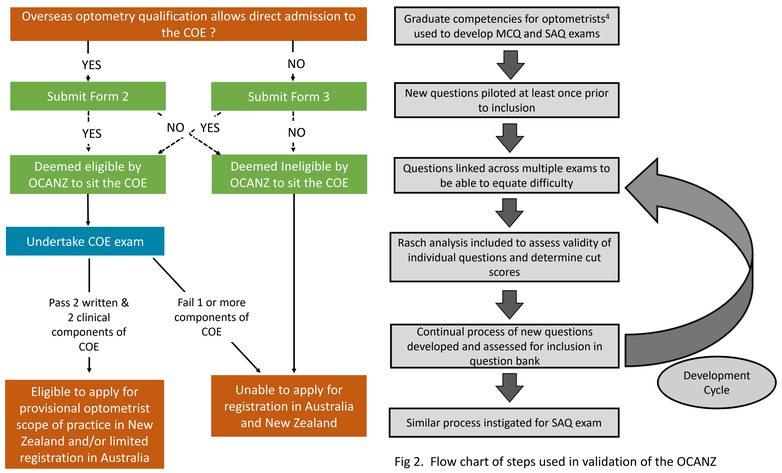

Fig 1. Flow chart of the OCANZ application and evaluation process for overseas-educated optometrists.

OCANZ = Optometry Council of Australian and New Zealand
COE = Competency in Optometry Examination

Fig 2. Flow chart of steps used in validation of the OCANZ written examinations.

MCQ = Multiple choice question
SAQ = Short answer question

METHODS

Exam Development and Validation

- Content based on competency standards.[3-4]
- Question selection based on blueprint, weighted towards key competencies.[3-4]
- Question writers subject matter experts recruited from profession.
- Training workshops on question writing (multiple choice question (MCQ) & short answer questions (SAQ)) provided by assessment expert (NC).
- OCANZ question writing guide for MCQ and SAQ (Chiavaroli N, April 2018).
- MCQ & SAQ database formed.
- Standard setting exercise (2011 MCQ; 2017 MCQ & SAQ).
- **Item response theory (Rasch)** : analyse exams, produce reliability metrics, apply standards to results, determine relative difficulty to calibrate exams, score candidates.
- Ethics approval obtained (Uni of Melbourne).

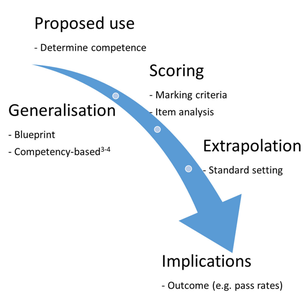

Fig 3. Validity Framework: Application of **Kane's framework**[5] to evaluate the validity of the OCANZ examination process.

RESULTS

Sample MCQ[2]

The primary cause of blindness in Australia and New Zealand for people over the age of 55 years is

a. Cataract
b. Glaucoma
c. Macular degeneration
d. Diabetic retinopathy

Sample SAQ[2]

Your patient is a 12 year old boy who has been referred to you for advice following the detection of a colour vision problem with the Ishihara plate test at a school vision screening. He passed the other tests of visual performance at the screening.

a. List the tests that should be performed to determine the nature and characteristics of the colour vision problem in this patient. (4 marks)
b. What is the most common type of inherited colour vision defect in males? (1 mark)
c. Your patient has the most common type of inherited colour vision defect that appears in males. List in point form the most important advice that should be provided to this patient. (5 marks)

MCQ scores

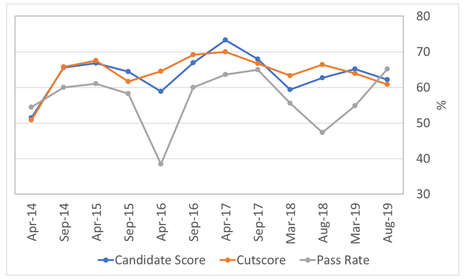

Fig 4. Mean candidate scores and corresponding cutscores and pass rates for each administration of the MCQ component of the written component of the COE.

SAQ scores

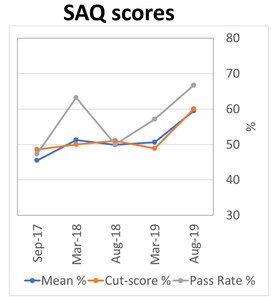

Fig 5. Mean candidate scores and corresponding cutscores and pass rates for each administration of the SAQ component of the written component of the COE.

Correlation

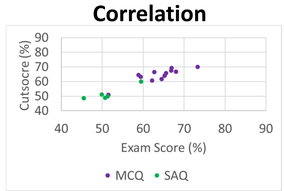

Fig 6. There was a relationship between candidate performance and cutscore for the MCQ (purple: r = 0.86, p < 0.001) and the SAQ (green: r = 0.92, p = 0.03).

SAQ Exam Descriptive Statistics

Administrative exam number	1	2	3	4	5
Date of administration	Sept 2017	March 2018	August 2018	March 2019	August 2019
No of candidates	19	19	18	21	24
No of questions	18	18	18	18	18
No of linked questions	n/a	2	2	3	2
Mean candidate score (%)	45.5	51.3	49.9	50.7	59.5
Item-trait interaction[a]	0.93	0.42	0.39	0.77	0.42
Separation Index	0.93	0.89	0.84	0.83	0.82
Cutscore (%)	48.6	50	51.1	48.9	60.0
Pass rate (%)	47.4	63.2	50.0	57.1	66.7

a: In Rach analysis, the item-trait interaction evaluates the invariance to the scale i.e. whether or not the data fits the model for class intervals along the scale.

Summary, Outcome & Clinical Assessment

- Data from 12 administrations of MCQ exam to 13 to 33 candidates (median 21)
  - ✓57.0% pass rate (range 47.4 to 65.2)
  - ✓0.84 reliability (range 0.71 to 0.93)
- Data from 5 administration of SAQ exam to 18 to 24 candidates (median 19)
  - ✓56.9% pass rate (range 47.4 to 66.7)
  - ✓0.86 separation index (range 0.82 to 0.93)
- 59 of 73 candidates attempted the clinical exam to date
- 51 (86.4% of those who attempted) completed the 4-stage process

MCQ Exam Descriptive Statistics

Administrative exam number	1	2	3	4	5	6	7	8	9	10	11	12
Date of administration	April 2014	Sept 2014	April 2015	Sept 2015	April 2016	Sept 2016	April 2017	Sept 2017	March 2018	August 2018	March 2019	August 2019
No of candidates	33	25	18	24	13	20	22	20	18	19	22	23
No of questions: administered	132	132	132	132	132	132	132	132	144	144	144	144
linked	23	23	21	20	20	26	28	21	10	20	14	17
piloted	12	12	12	12	12	12	12	12	24	24	24	24
flagged	12	15	12	10	15	18	1	0	16	13	16	17
scored	120	120	120	120	120	120	120	120	120	119	119	120
Mean candidate score (%) (Range)	51.5 (34 to 74)	65.6 (49 to 81)	66.9 (44 to 83)	64.5 (33 to 86)	58.9 (43 to 70)	66.9 (37 to 83)	73.3 (61 to 82)	68.0 (38 to 89)	59.4 (36 to 78)	62.7 (30 to 81)	65.2 (49 to 79)	62.2 (32 to 78)
Mean discrimination index	0.20	0.20	0.23	0.23	0.14	0.27	0.16	0.33	0.26	0.30	0.19	0.29
Reliability Index	0.80	0.79	0.85	0.88	0.78	0.89	0.71	0.93	0.89	0.91	0.79	0.91
Cutscore (%)	50.8	65.8	67.5	61.7	64.6	69.2	70.0	66.7	63.3	66.4	63.9	60.8
Pass rate (%)	54.5	60	61.1	58.3	38.5	60	63.6	65	55.6	47.4	54.9	65.2

DISCUSSION

- The stepped approach to item development and monitoring (i.e. non-scored pilot, review, revision of pilot and underperforming items and re-pilot as necessary, inclusion in scored item database) helps ensure the ongoing robustness of the item bank.
- This research describes a rigorous process by which the score that constitutes a pass mark for the written component of a credentialing assessment for overseas-educated optometrists is determined. Linking of common items and use of Rasch analysis ensures that the cutscore for each exam is set to ensure the same relative exam difficulty is administered.
- The current cumulative pass rate of 57% reflects a challenging examination that attempts to strike an appropriate balance between protecting the public and professional standards and fairness to candidates.
- The validation process described in this research benchmarks favourably against that used by other health professions[6] and could be adopted in other settings. Overseas-educated candidates can have confidence that they are sitting a credentialing assessment that tests optometric core competencies and maintains a similar level of difficulty across administrations.

CONCLUSION

Findings support the validity of the written components (MCQ and SAQ) of the credentialing of the competency of overseas-educated optometrists in Australia and New Zealand.

EMAIL CONTACT

Contact i.jalbert@unsw.edu.au if you are interested in this research. We would love to hear from you!

ACKNOWLEDGEMENT/FUNDING

The Optometry Council of Australia and New Zealand provided travel support for this research. Excel Psychological and Educational Consultancy Pty Ltd (EPEC) was contracted to conduct psychometric analysis of these date. We thank Mr. John Barnard, Executive Director at EPEC for his contribution.

REFERENCES

1. Australian Commission on Safety and Quality in Health Care, Sydney: ACSQHC, 2015.
2. www.ocanz.org
3. Kiely PM. Clin Exp Optom 2009;92:362-386.
4. Kiely PM & Slater J. Clin Exp Optom 2015;98:65-89.
5. Cook DA, et al. Med Educ 2015;49:560-575.
6. Chiavaroli NG et al. Nutr Diet 2018;75:235-243.

Optometry Council of Australia and New Zealand