

Welcome to CBVE Town Hall



How-to Operationalize Competency-based
Veterinary Education (CBVE) within your Program

Overview for Today

- Review the components of the CBVE model
- Discuss why and how OSU CVM adopted the use of competencies and milestones on our I.T.E.R. for high stakes assessment
- Discuss why and how OSU CVM adopted the use of EPA's for low stakes direct observation assessment
- Review some of the results obtained for the class of 2021
- Q & A

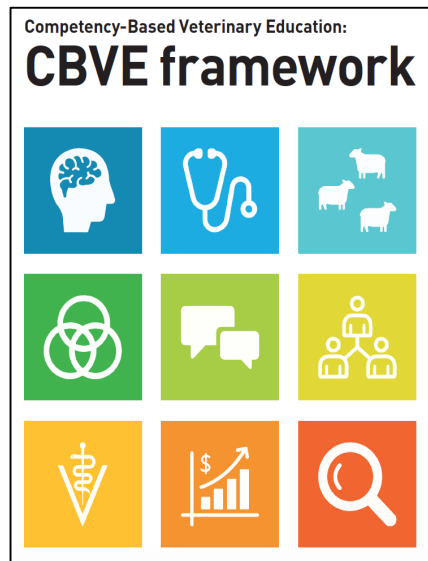


Part I: The CBVE Components

Emma K. Read, DVM, MVSc, DACVS
Associate Dean for Professional Programs
The Ohio State University

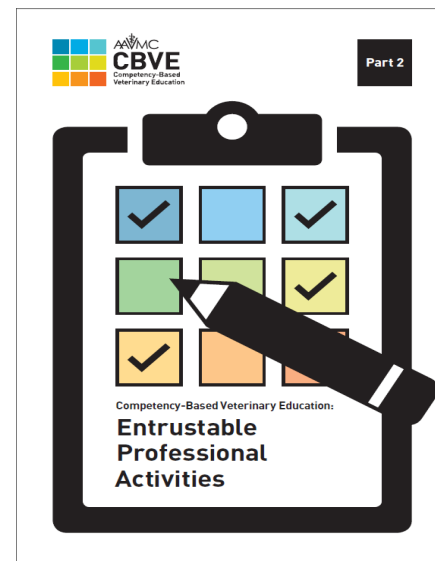


3 parts to competency-based veterinary education (CBVE)



**Part 1 – 2018
Framework of
competencies**

Domains of Competence		
1		Clinical Reasoning and Decision-making
2		Individual Animal Care and Management
3		Animal Population Care and Management
4		Public Health
5		Communication
6		Collaboration
7		Professionalism and Professional Identity
8		Financial and Practice Management
9		Scholarship



**Part 2 – 2018
Entrustable
Professional
Activities (EPAs)**

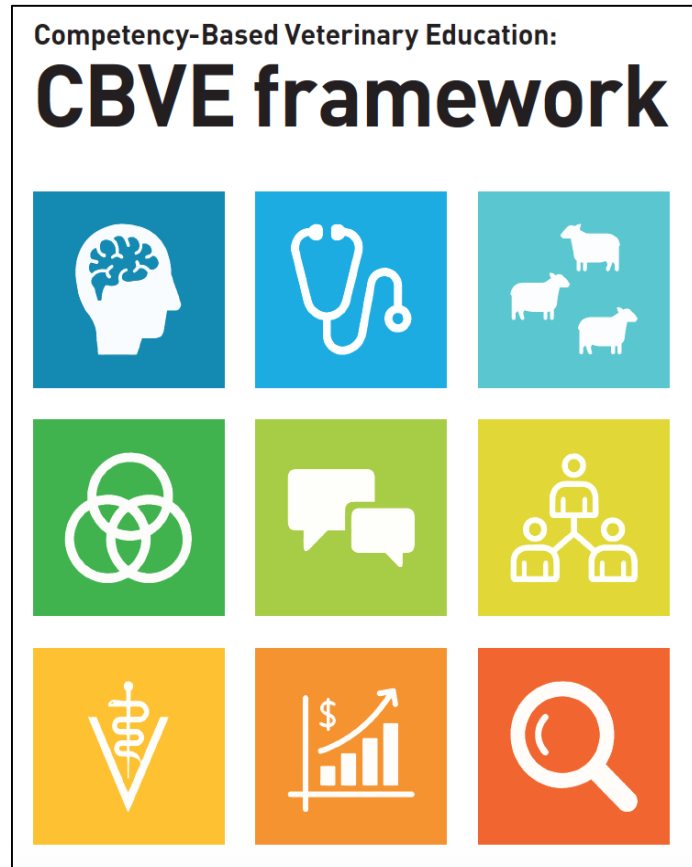


**Part 3 – 2019
Milestones**

Please visit: CBVE.org for more details and copies of the documents



CBVE Framework



Part #1 –

Competencies

describes the veterinarian
includes

9 Domains

32 Competencies



9 Domains of Competence

Broad groupings of competencies that taken together describe the complete veterinarian

Competency-Based Veterinary Education: CBVE framework

Domains of Competence		
1		Clinical Reasoning and Decision-making
2		Individual Animal Care and Management
3		Animal Population Care and Management
4		Public Health
5		Communication
6		Collaboration
7		Professionalism and Professional Identity
8		Financial and Practice Management
9		Scholarship

DOMAIN 1

Clinical Reasoning and Decision-making

The graduate demonstrates critical thinking and problem solving to arrive at evidence-based decisions that consider animal and client needs, available resources, and social context.

	COMPETENCIES	ILLUSTRATIVE SUBCOMPETENCIES
1.1	Gathers and assimilates relevant information about animals	a. Collects history b. Performs physical examination c. Interprets diagnostic test results d. Performs necropsy examination
1.2	Synthesizes and prioritizes problems to arrive at differential diagnoses	a. Identifies problems b. Creates refined problem list c. Prioritizes differential diagnoses
1.3	Creates and adjusts a diagnostic and/or treatment plan based on available evidence	a. Appraises available clinical information and acts accordingly despite uncertainty b. Explains justification for plan c. Re-evaluates animal or population in a timely manner to adjust plan d. Uses critical thinking to determine appropriate action when unexpected outcomes occur (e.g., complications, changed diagnosis)

Standardized across programs

Adapt to fit your program



Competency

- An observable ability of a health professional, integrating multiple components such as **knowledge, skills, values and attitudes**.
- Since competencies are **observable**, they can be **assessed** to ensure their acquisition.

Frank et al cited by Englander et al, 2013



Entrustable Professional Activities



Part #2 -

EPAs

describes the core activities of a clinical practice veterinarian

8 core activities



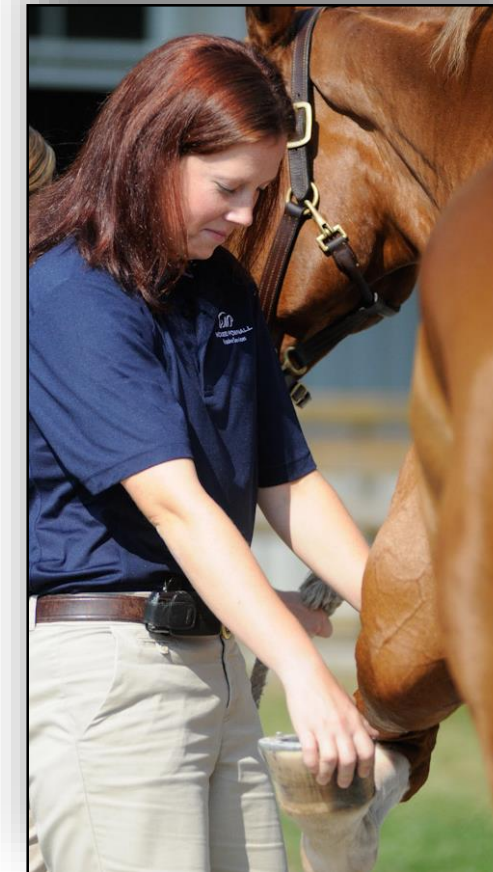
Entrustable Professional Activities



EPAs are the day-to-day **activities** of veterinarians in clinical practice.

Requires integration of multiple competencies across different domains.


Translates competencies into a clinical context and provides opportunity for assessment.

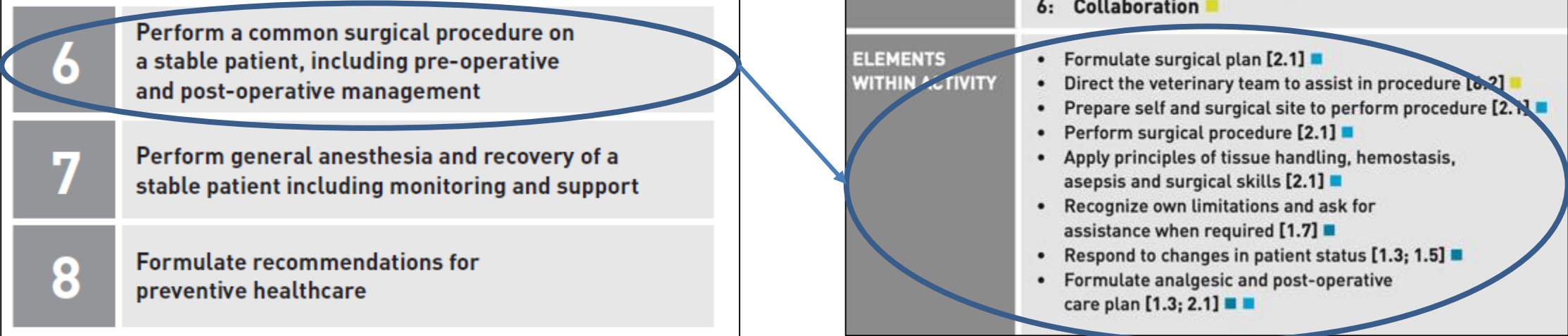


Entrustable Professional Activities



1	Gather a history, perform an examination, and create a prioritized differential diagnosis list
2	Develop a diagnostic plan and interpret results
3	Develop and implement a management/treatment plan
4	Recognize a patient requiring urgent or emergent care and initiate evaluation and management
5	Formulate relevant questions and retrieve evidence to advance care
6	Perform a common surgical procedure on a stable patient, including pre-operative and post-operative management
7	Perform general anesthesia and recovery of a stable patient including monitoring and support
8	Formulate recommendations for preventive healthcare

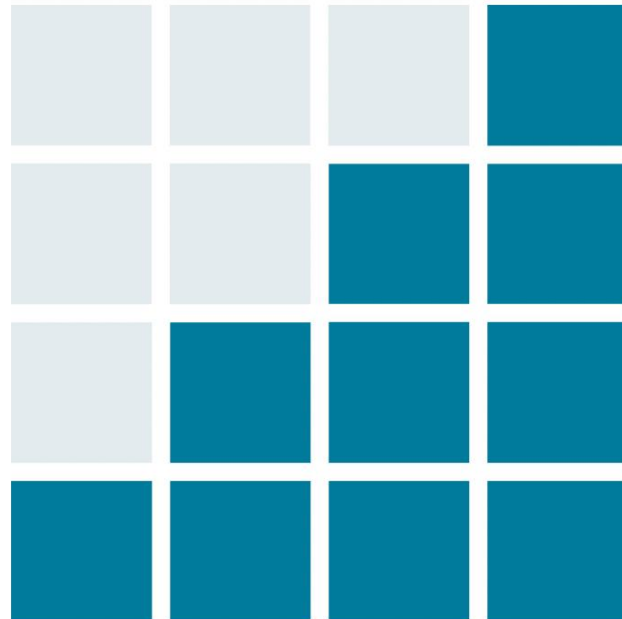
 <h2>EPA 6</h2> <p>Perform a common surgical procedure on a stable patient, including pre-operative and post-operative management</p>	
DESCRIPTION OF ACTIVITY	Perform a surgical procedure, including pre-operative preparation of the patient and the surgeon and post-operative care.
COMMENTARY	Attention to patient preparation to minimize contamination, knowledge of the procedure and regional anatomy, manual dexterity to competently and efficiently complete the procedure, reflection and response to changes, and post-operative care.
MOST RELEVANT DOMAINS	<p>1: Clinical Reasoning & Decision-making ■</p> <p>2: Individual Care & Management ■</p> <p>6: Collaboration ■</p>
ELEMENTS WITHIN ACTIVITY	<ul style="list-style-type: none"> Formulate surgical plan [2.1] ■ Direct the veterinary team to assist in procedure [6.2] ■ Prepare self and surgical site to perform procedure [2.1] ■ Perform surgical procedure [2.1] ■ Apply principles of tissue handling, hemostasis, asepsis and surgical skills [2.1] ■ Recognize own limitations and ask for assistance when required [1.7] ■ Respond to changes in patient status [1.3; 1.5] ■ Formulate analgesic and post-operative care plan [1.3; 2.1] ■ ■





Part 3

Competency-Based Veterinary Education:
Milestones



Part #3 -

Milestones

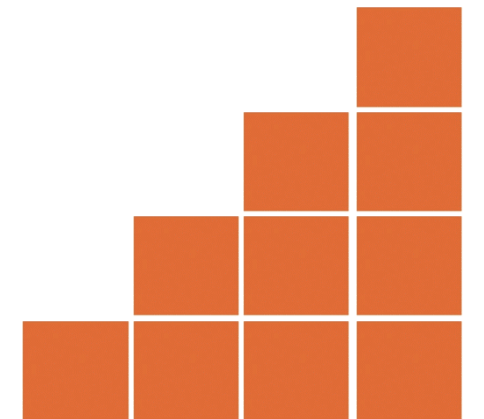
describes the **observable markers** of an individual's ability along a developmental continuum

4 milestones per competency




Milestones

- Describes **learner's ability** observed during clinical activities across continuum over time
- Four anchor points described in CBVE for each competency



Milestones



DOMAIN 1

Clinical Reasoning and Decision-making

The graduate demonstrates critical thinking and problem solving to arrive at evidence-based decisions that consider animal and client needs, available resources, and social context.

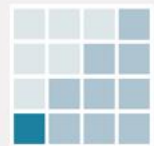



COMPETENCIES		ILLUSTRATIVE SUBCOMPETENCIES
1.1	Gathers and assimilates relevant information about animals	<ul style="list-style-type: none"> a. Collects history b. Performs physical examination c. Interprets diagnostic test results d. Performs necropsy examination
1.2	Synthesizes and prioritizes problems to arrive at differential diagnoses	<ul style="list-style-type: none"> a. Identifies problems b. Creates refined problem list c. Prioritizes differential diagnoses
1.3	Creates and adjusts a diagnostic and/or treatment plan based on available evidence	<ul style="list-style-type: none"> a. Appraises available clinical information and acts accordingly despite uncertainty b. Explains justification for plan c. Re-evaluates animal or population in a timely manner to adjust plan d. Uses critical thinking to determine appropriate action when unexpected outcomes occur (e.g., complications, changed diagnosis)

1.2

COMPETENCY 1.2

Synthesizes and prioritizes problems to arrive at differential diagnoses

MILESTONES

	<p>NOVICE: Focuses on the client complaint. Does not recognize additional problems or generate a problem list. List of differential diagnoses is not prioritized and includes irrelevant conditions.</p>
	<p>ADVANCED BEGINNER: Develops a problem list that is predominantly accurate with occasional omissions. Differential list may be excessive but demonstrates some prioritization.</p>
	<p>COMPETENT: Develops an accurate, prioritized problem list and differential list for common problems consistently.</p>
	<p>PROFICIENT: Follows systematic procedure for synthesis, comparison, and evaluation of information. Quickly filters irrelevant information and identifies unknowns.</p>



Part II: The Ohio State University



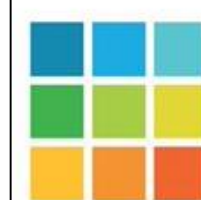
ITER Changes



THE OHIO STATE UNIVERSITY
COLLEGE OF VETERINARY MEDICINE



**UNIVERSITY OF
CALGARY**



AAVMC
CBVE
Competency-Based
Veterinary Education

OSU's "Old" I.T.E.R. form

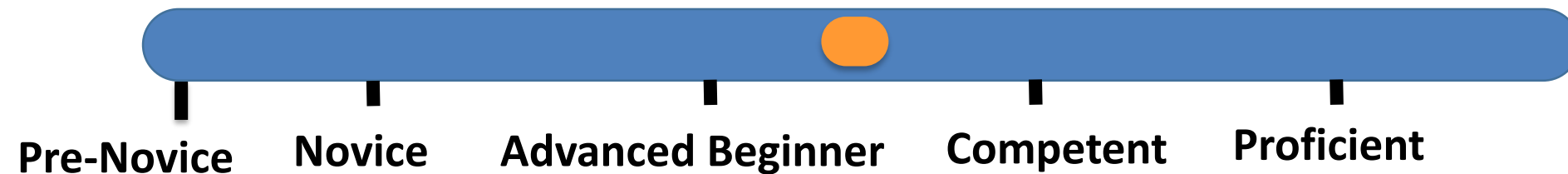
- Had 27 items rated on a 5-point Likert scale – Used as summative assessment
(Not observed; Unsatisfactory; Marginal; Satisfactory; Superior)
- Items assessed: knowledge, clinical skills, interpersonal skills, professionalism, animal health promotion
- Included global score determined by 'gut feel':

A, A-, B+, B, B-, C+, C, C-, or E

- C grade was marginal performance and might require repetition – rotation leader decided. E grade resulted in dismissal from program
- Clinical attendance policy - students missing >2 days needed to repeat entire rotation – not based on competence – based on "time served"

OSU's "New" I.T.E.R. form

- Each rotation selected the competencies they could observe in every single student
- Not every competency could be assessed on every rotation (longitudinal assessment: foundation for programmatic assessment)
- Selected milestone for each competency: from pre-novice to proficient



- Included global score: Satisfactory (S), Borderline (B), Unsatisfactory (U)
- Opportunity to "ITER Flag" – confidential message to Associate Dean

The "New" I.T.E.R. form



The College of Veterinary Medicine
at The Ohio State University
Yr4 Vets

Evaluated By: *evaluator's name*

Evaluating : *person (role) or moment's name (if applicable)*

Dates : *start date to end date*

* indicates a mandatory response

	Pre- Novice						Novice										Advanced Beginner										Competent										Proficient
*Competency 1.1: Gathers and assimilates relevant information about animals (i.e. Collects history; Performs physical examination; Interprets diagnostic test results; Performs necropsy examination).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

PRE-NOVICE:
Does not yet meet the Novice level.

NOVICE:
Exercises safe animal handling. Poses historic questions from a template. Gathers insufficient, exhaustive, or irrelevant information. Performs disorganized or incomplete physical exam and may overlook key findings. Interpretation of results rarely advances the plan.

ADVANCED BEGINNER:
Gathers some pertinent information. May omit details that support/ refute common differential diagnoses. Physical exam follows a pattern and major abnormalities are identified, described and documented. Interprets laboratory tests correctly most of the time; struggles to interpret conflicting results. Interpretation of results partially advances the plan.

COMPETENT:
Obtains pertinent history appropriate for the situation. Identifies and organizes historic elements consistent with common disorders. Performs thorough physical exam in a logical, fluid sequence. Identifies and documents most abnormal physical exam findings including subtle findings. Selects and interprets routine diagnostic tests appropriately. Ambiguous results are interpreted in the context of history and physical exam. Interpretation of results adequately supports the plan.

PROFICIENT:
Recognizes variability in disease presentation. Identifies historic information pertinent to unusual disease conditions. Efficiently reviews results and recognizes unexpected findings. The magnitude of abnormal findings contributes to interpretation. Summarizes findings using semantic qualifiers (e.g., acute, subacute and chronic). Accurate interpretation of results directs confirmatory or sequential testing and fully supports the plan.

The "New" I.T.E.R. form

Please rate this student's overall performance on this rotation block, according to your own observation and professional opinion:

- Unsatisfactory
- Borderline
- Satisfactory

Did you encounter any issues that should be flagged to the attention of the Associate Dean for Professional Programs and/or the Assistant Dean for Student Success?

- Yes (Please specify below)
- No

If you answered "Yes" that there are issues with this student, please indicate which area(s) should be addressed:

- Clinical Skills
- Communication
- Test taking issues/test taking anxiety/learnin gissues
- Mental well-being
- Medical Knowledge/Clinical reasoning/Problem solving
- Interprofessional skills, Professionalism, Time Management, Practice-based learning
- Honor code violation

If you answered "Yes" that there are issues with this student, please explain the specific issues you encountered:

Milestone Rating

- Collected one form from every instructor who worked with student – collated them into 'head form' – one 'head form' per student per rotation in One45
- Provided mean milestone rating for each competency (for each student on each block)
- Notice that there is a 5-point spread per milestone anchor
- Instructors just tell us what they saw – staff do the rest behind the scenes

* indicates a mandatory response

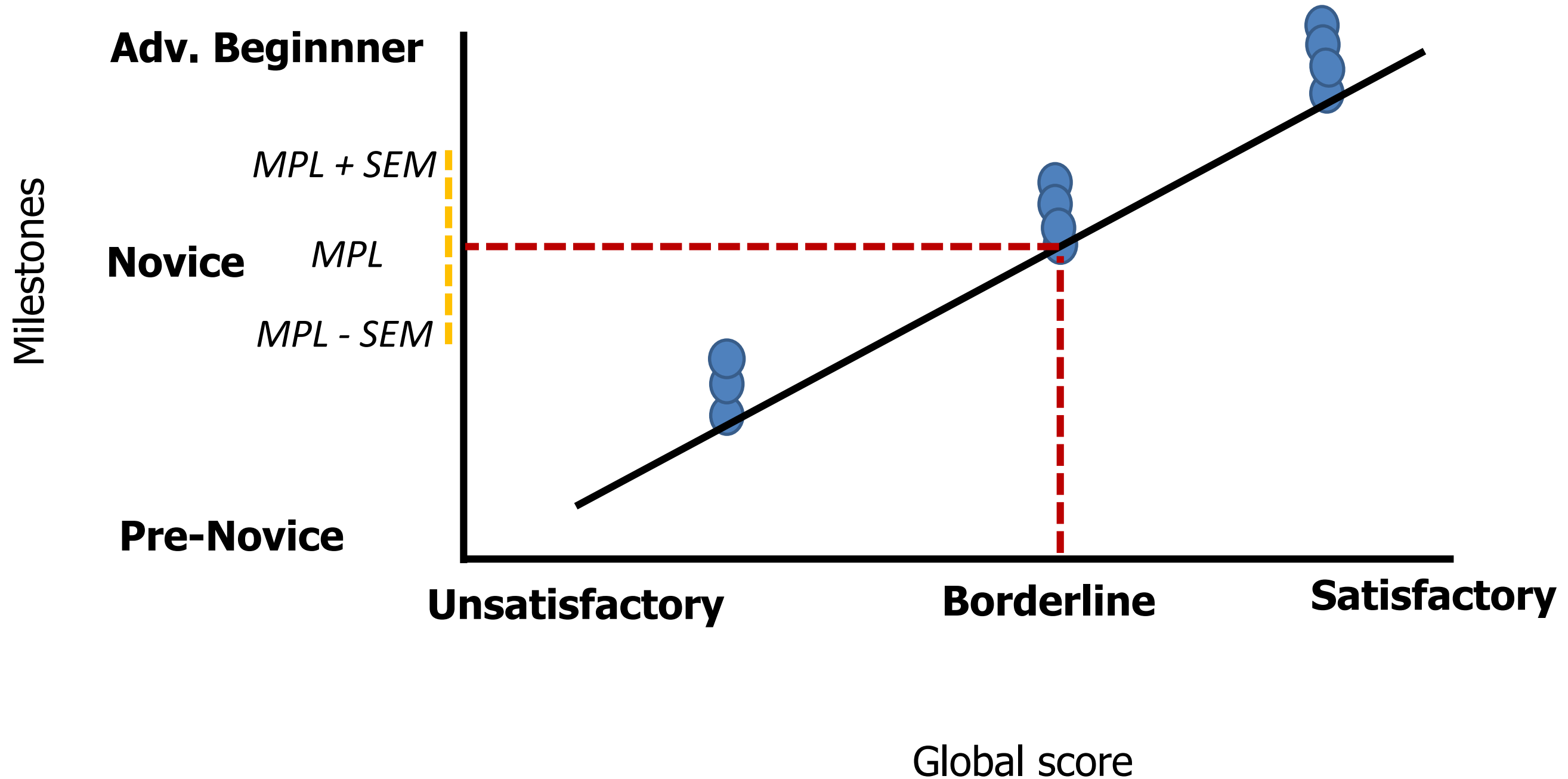
	Pre-Novice					Novice					Advanced Beginner					Competent					Proficient	
*Competency 1.1: Gathers and assimilates relevant information about animals (i.e. Collects history; Performs physical examination; Interprets diagnostic test results; Performs necropsy examination).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



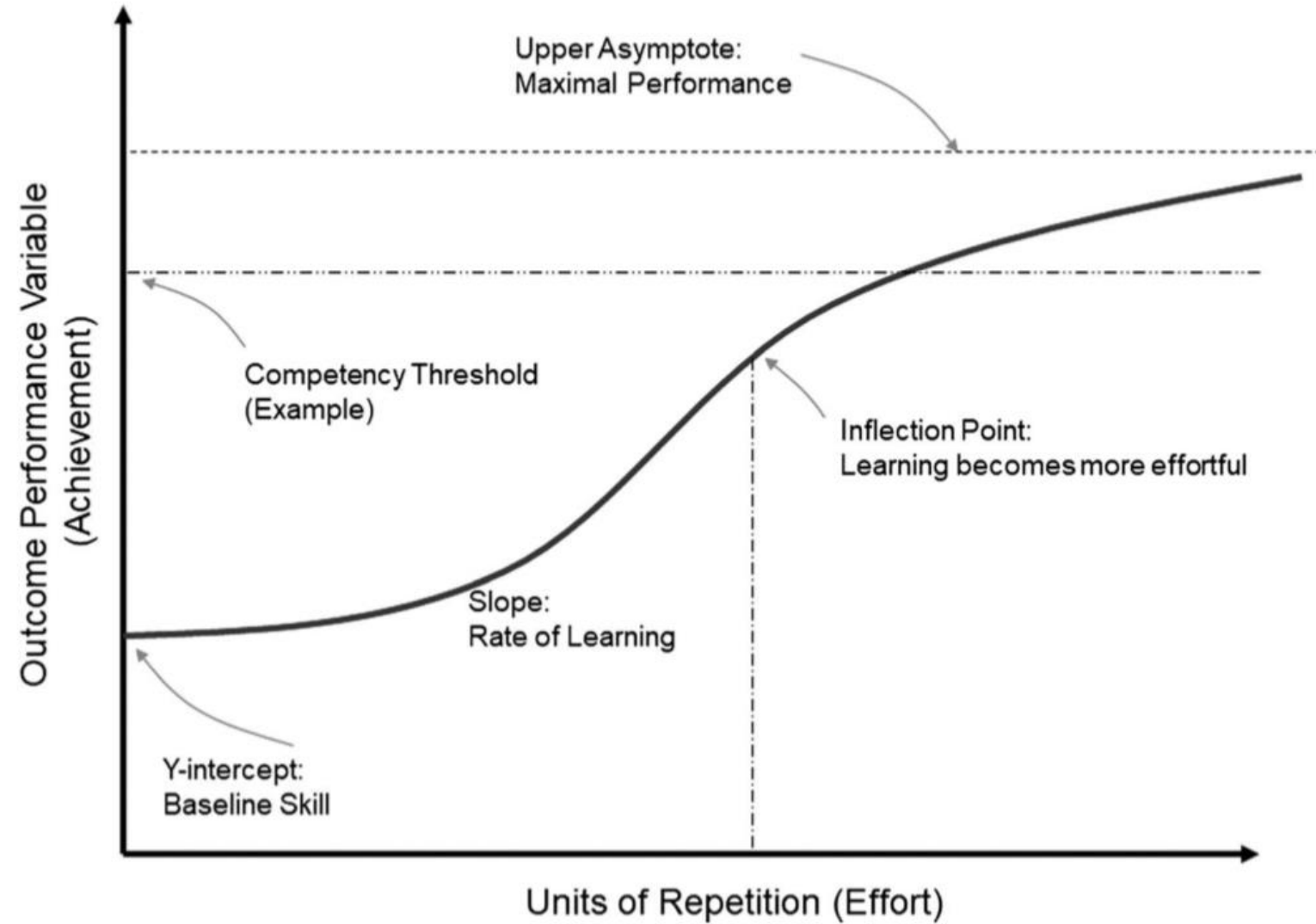
Determining S/U

- Each semester is one course– there are 3 of them in final year. Each course contains 8 rotations of 2 weeks
- Each rotation is graded S/U and therefore each course is graded S/U
- For each rotation block, the mean milestone rating for all competency domains (y axis) is plotted against the global score (x axis) – borderline regression analysis
- There is a unique 'y intercept' for minimum performance level for each rotation block.
Y intercept = MPL (minimum performance level)
- Above MPL = S,
- Below MPL = U,
- Borderline (MPL + SEM to MPL – SEM) is a conversation

Borderline Regression

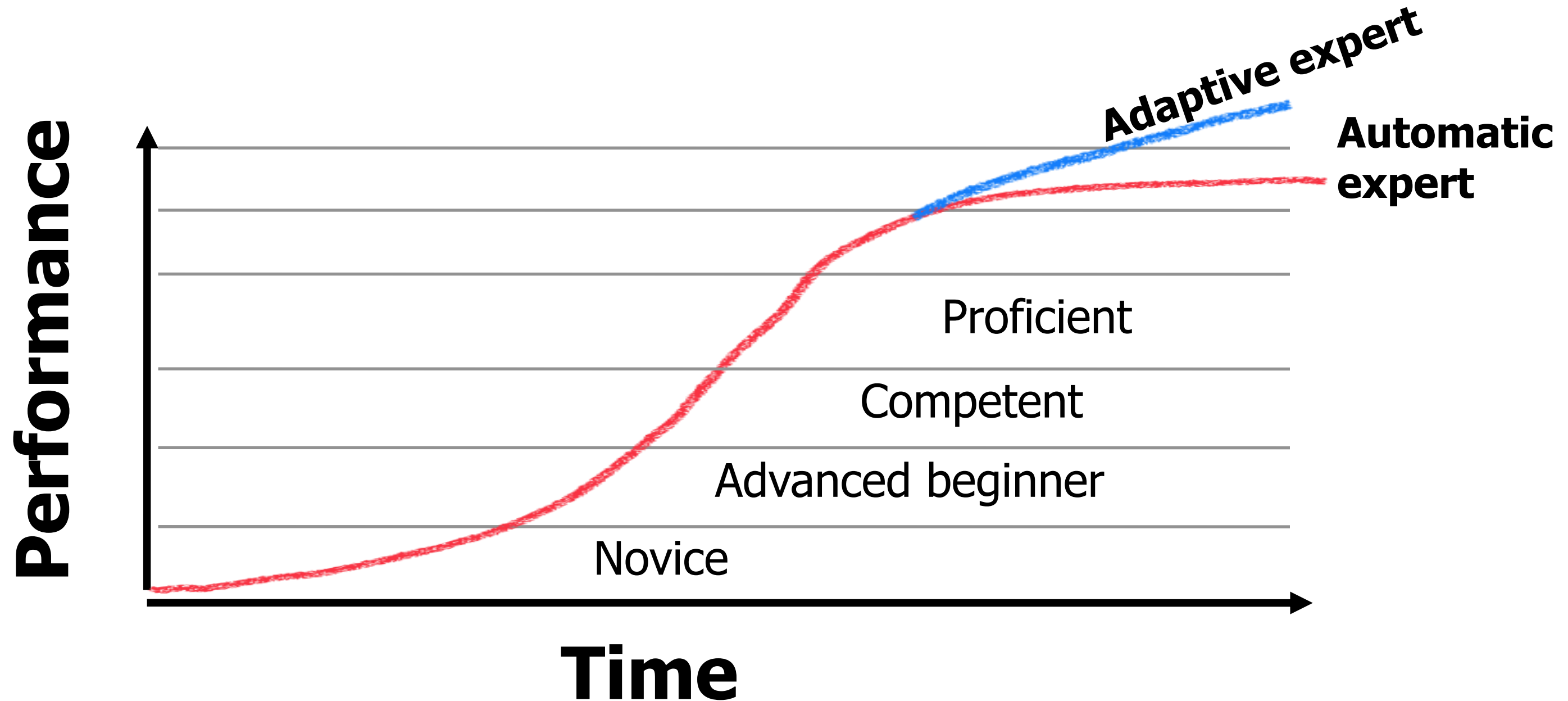


What do we ideally want to see in our learners?

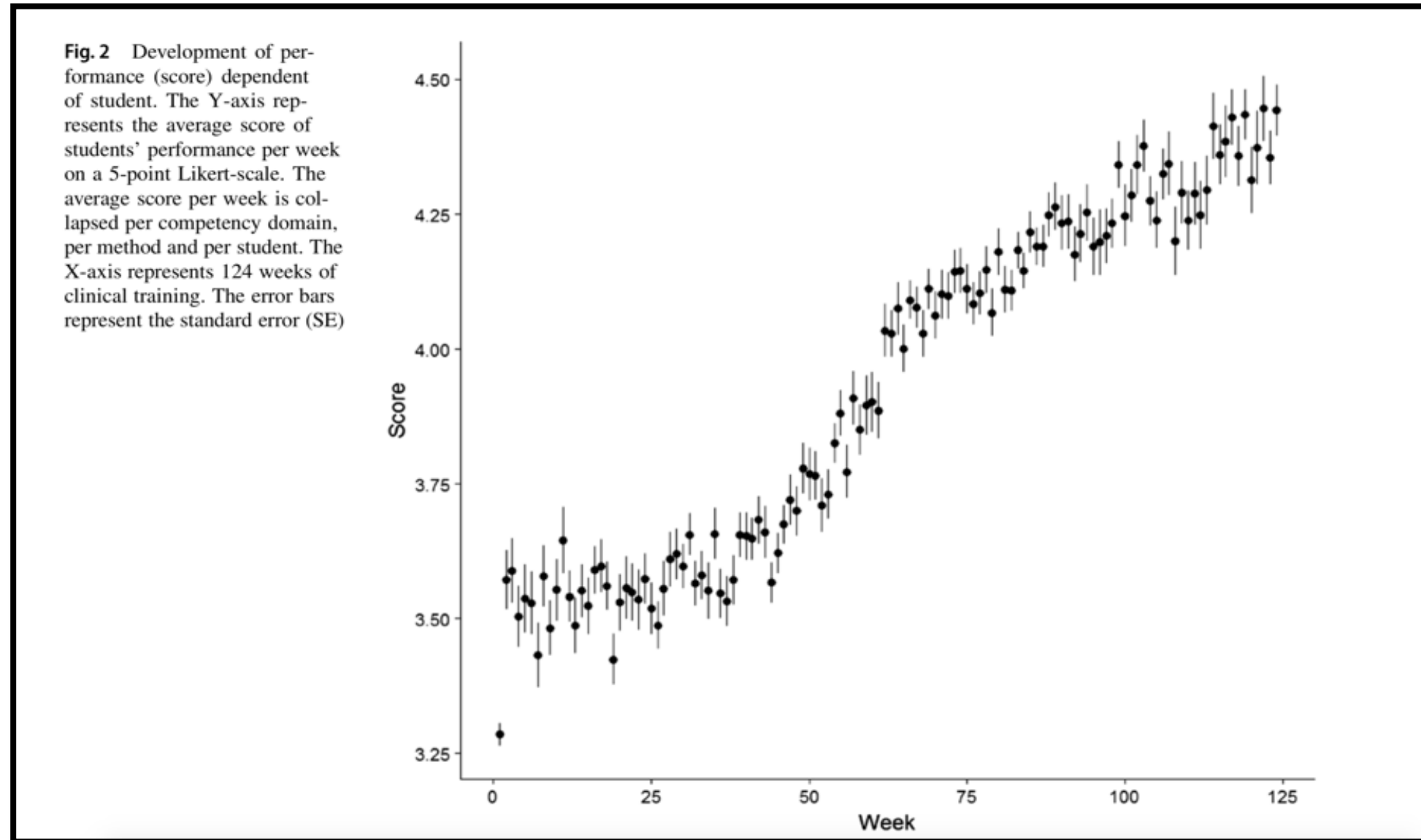


A learning curve over time

CBVE is based on the idea of the learning curve



A beautiful example of this in veterinary medicine

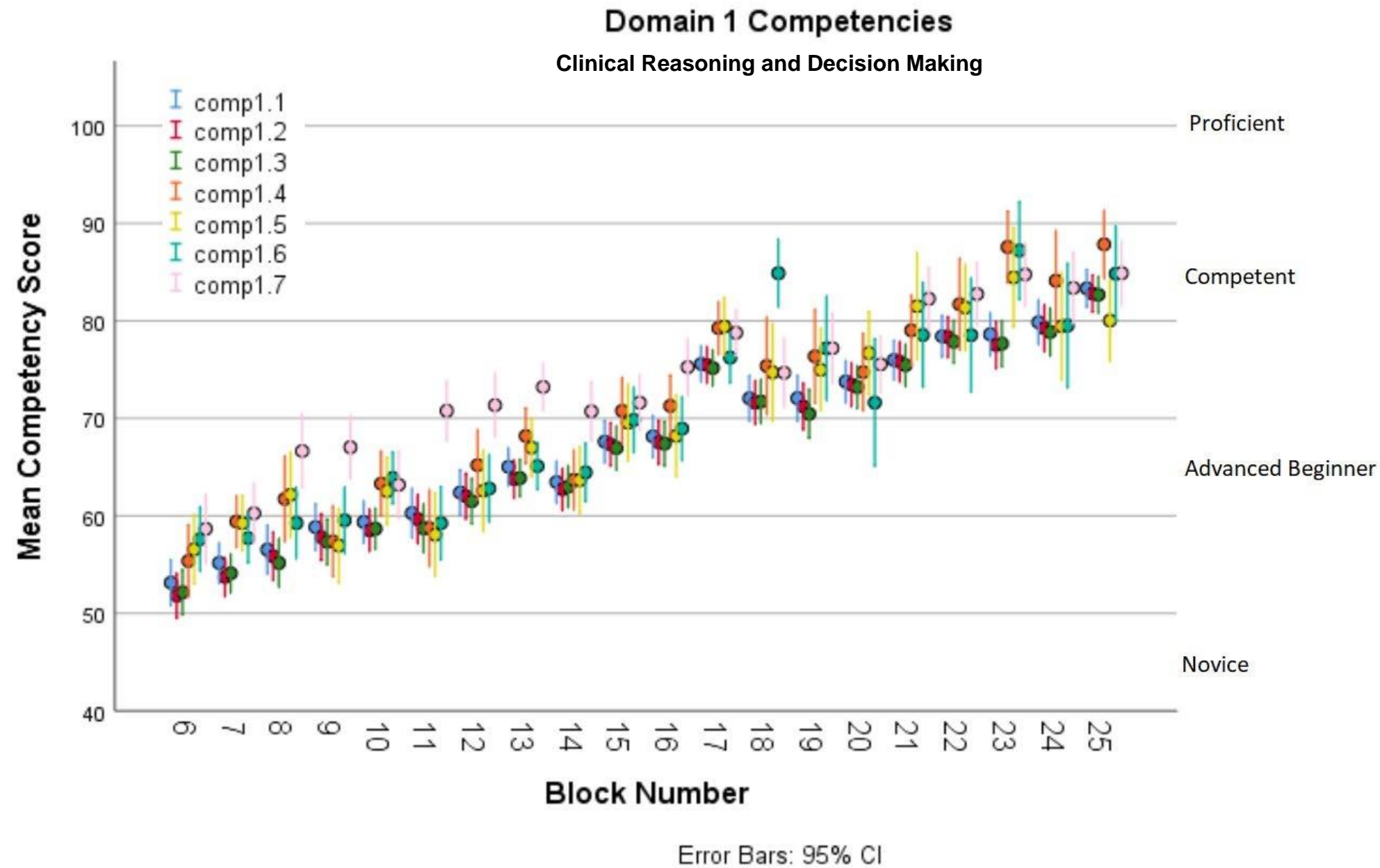


Bok H, deJong L, O'Neill T, Maxey C, and KG Hecker. 2018. Validity evidence for programmatic assessment in competency-based education. *Perspectives in medical education* 7: 362-372. .

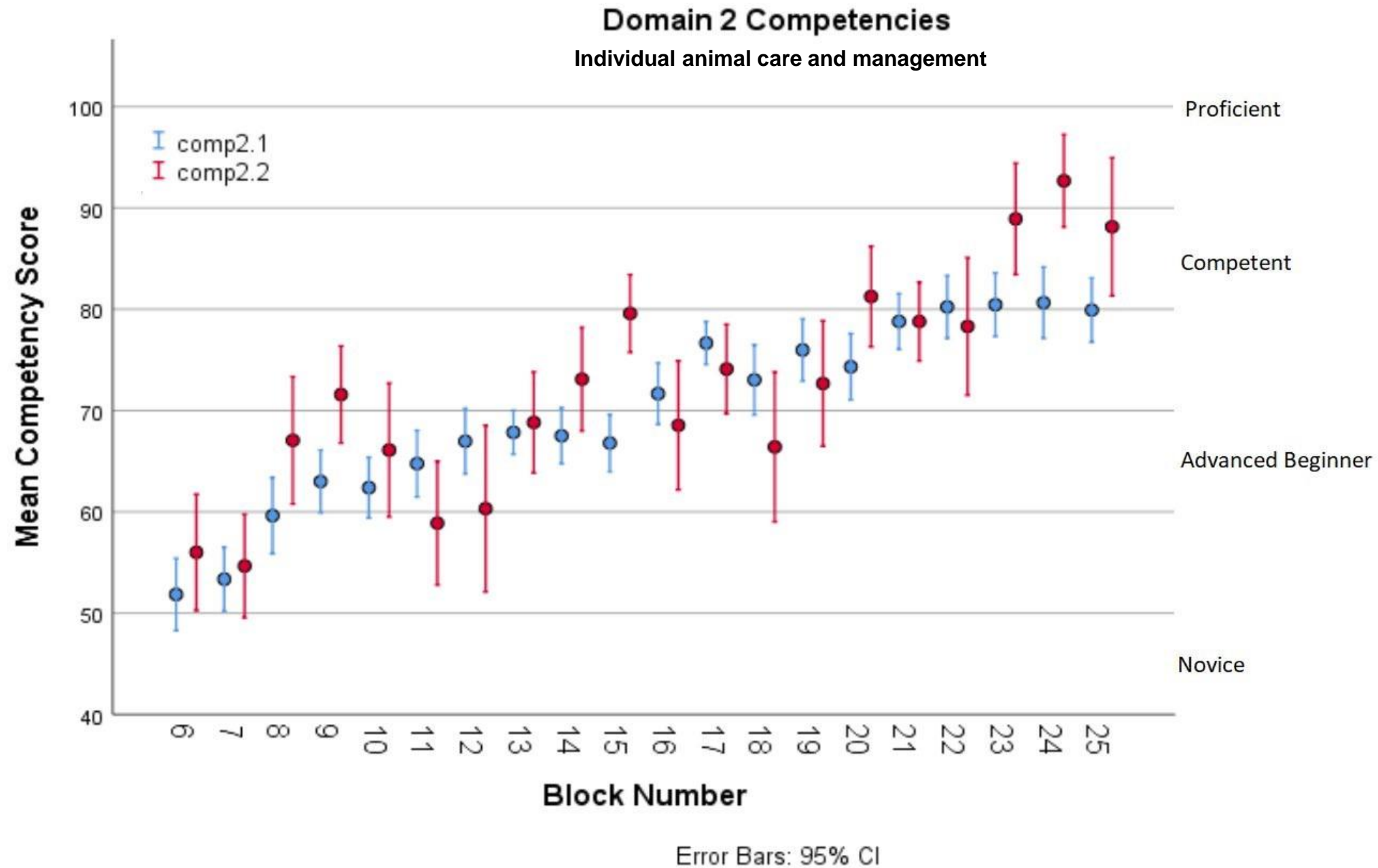
Summary for Class of 2021 – ITER Analysis Results

- 55 299 total competency assessments from ITERs over 19 blocks (2 weeks each)
- The following are visual representations of the average growth for the **entire cohort** across each of the 9 CBVE domains and 32 competencies for 11 months of the 2020-21 year (block 6 to block 25)

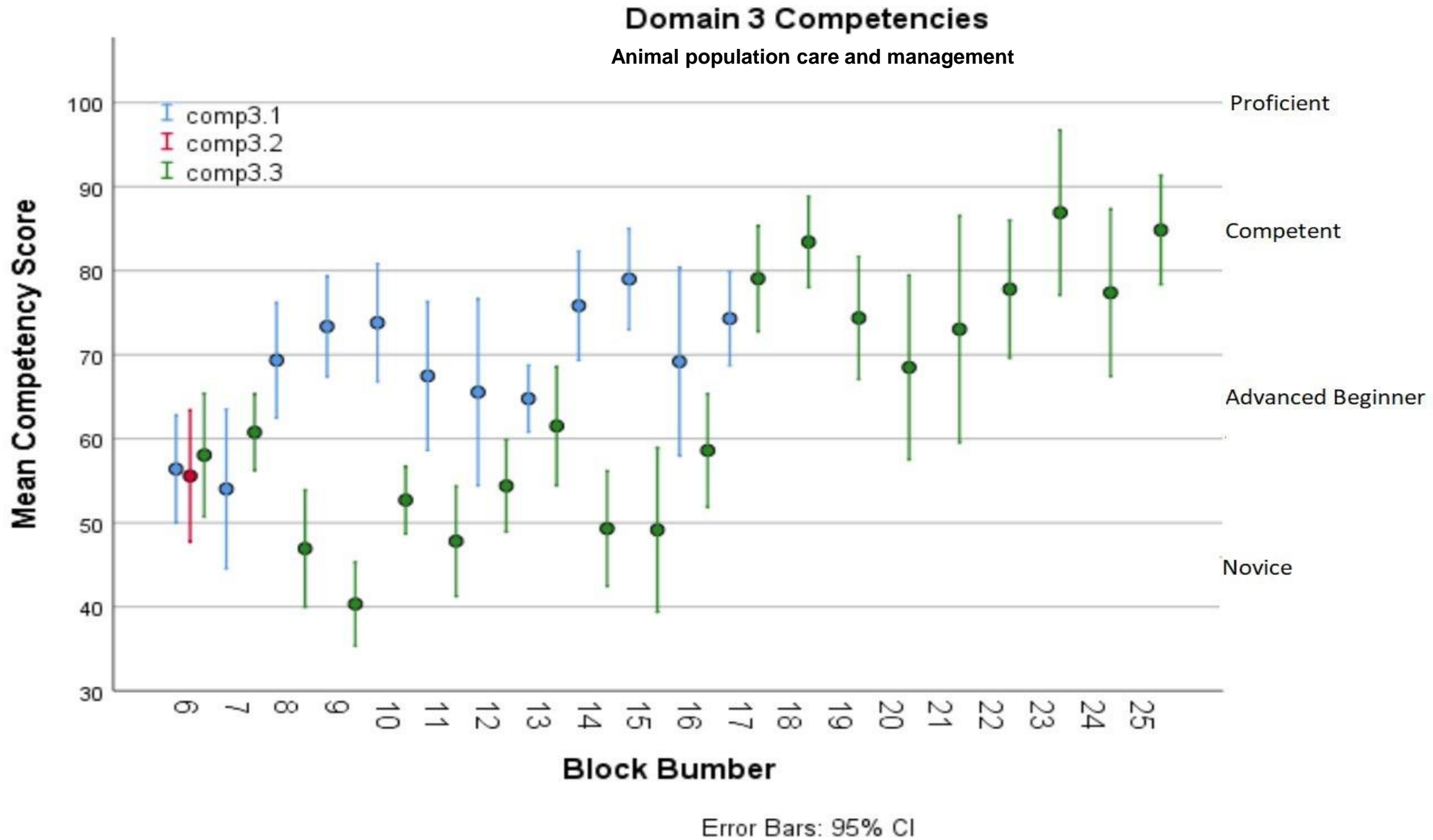
Summary of ITER Analysis – Domain 1



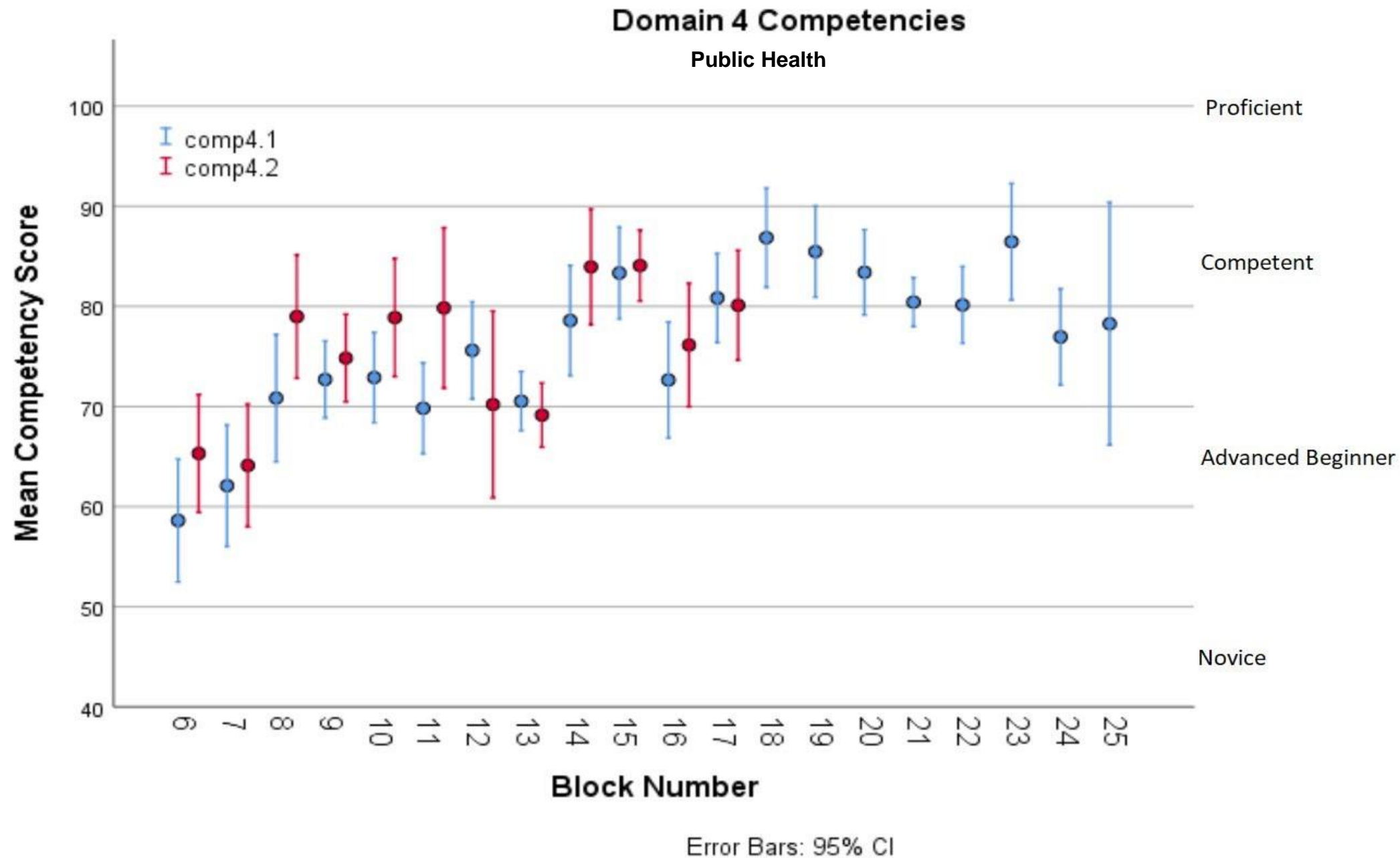
Summary of ITER Analysis – Domain 2



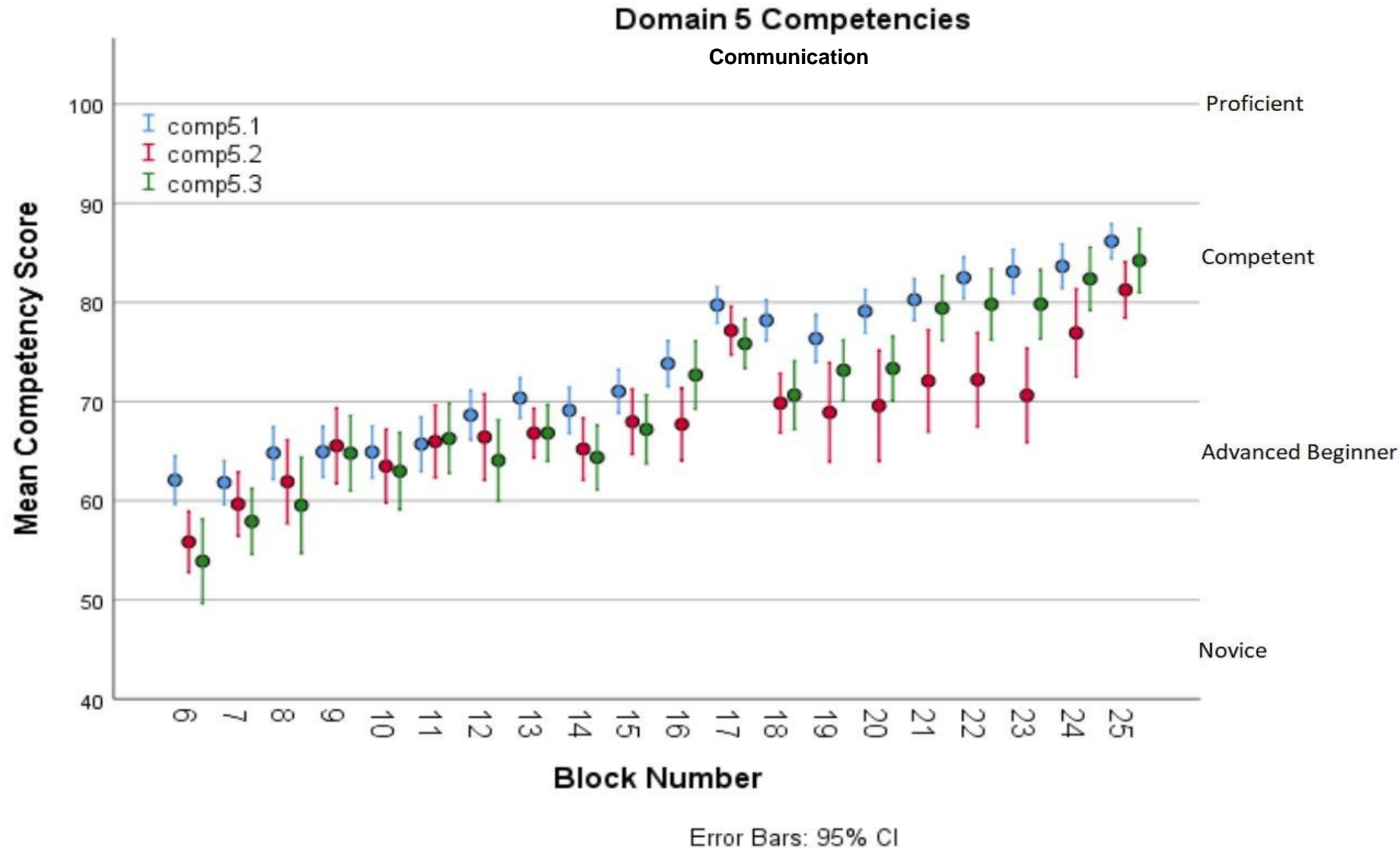
Summary of ITER Analysis – Domain 3



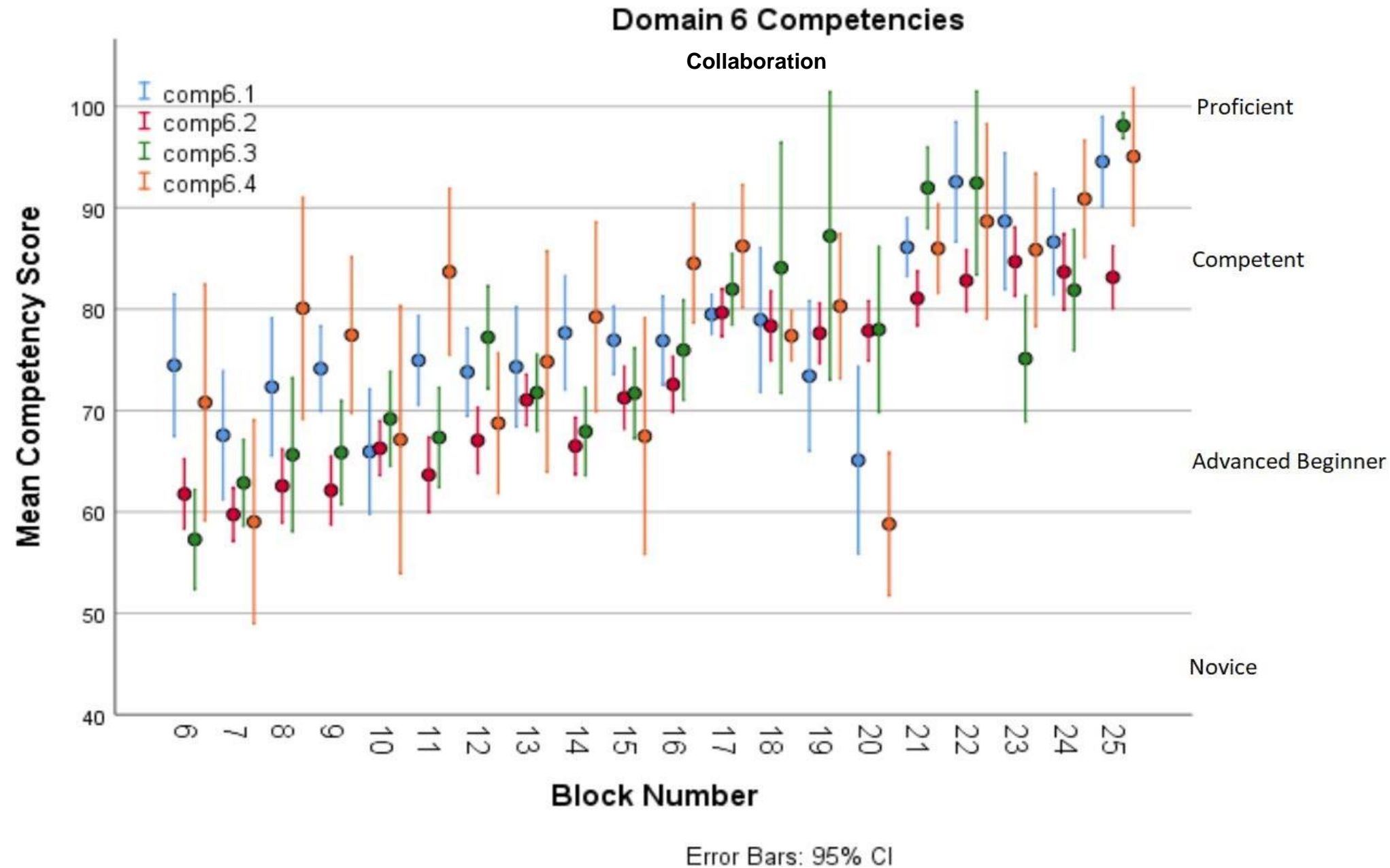
Summary of ITER Analysis – Domain 4



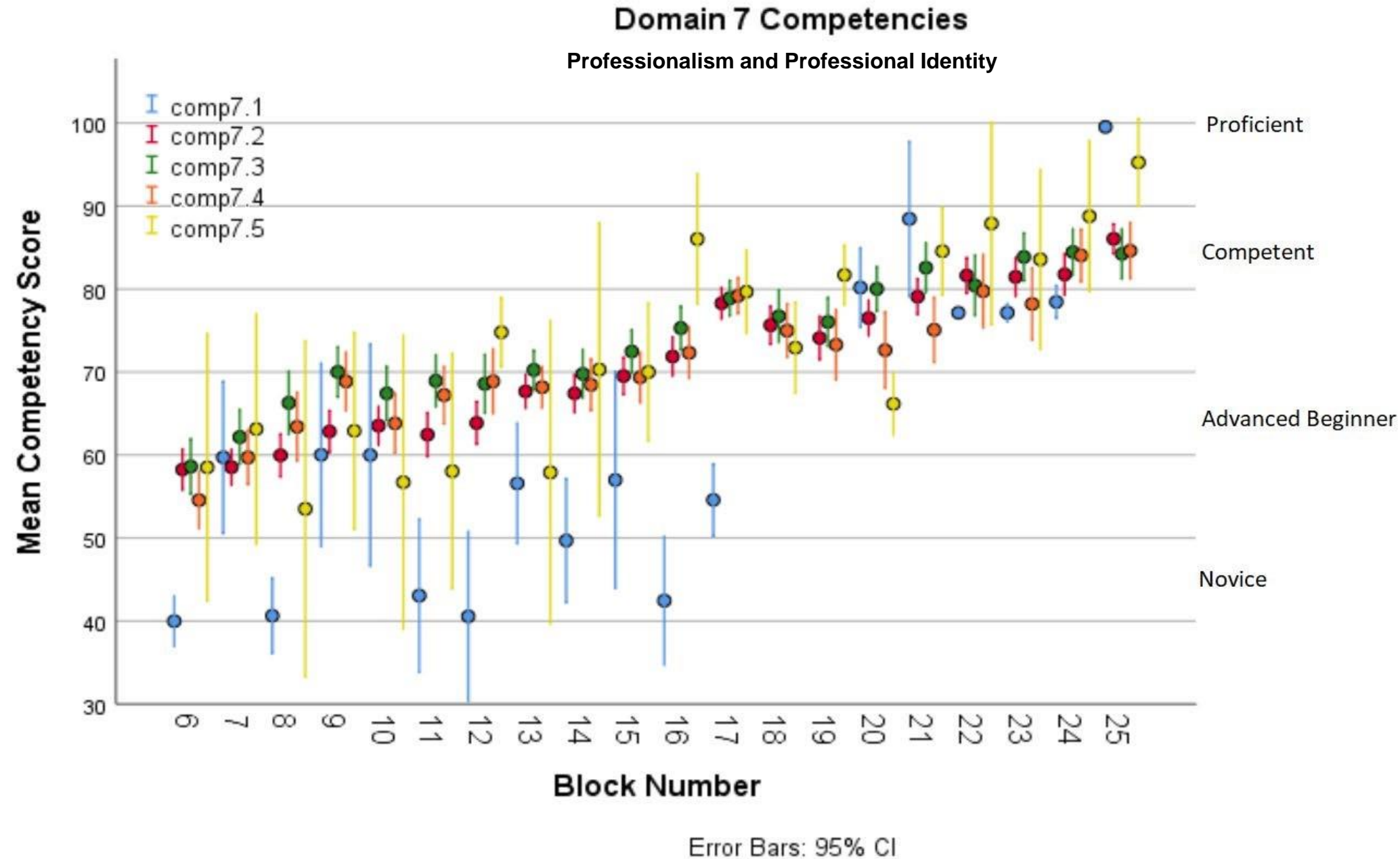
Summary of ITER Analysis – Domain 5



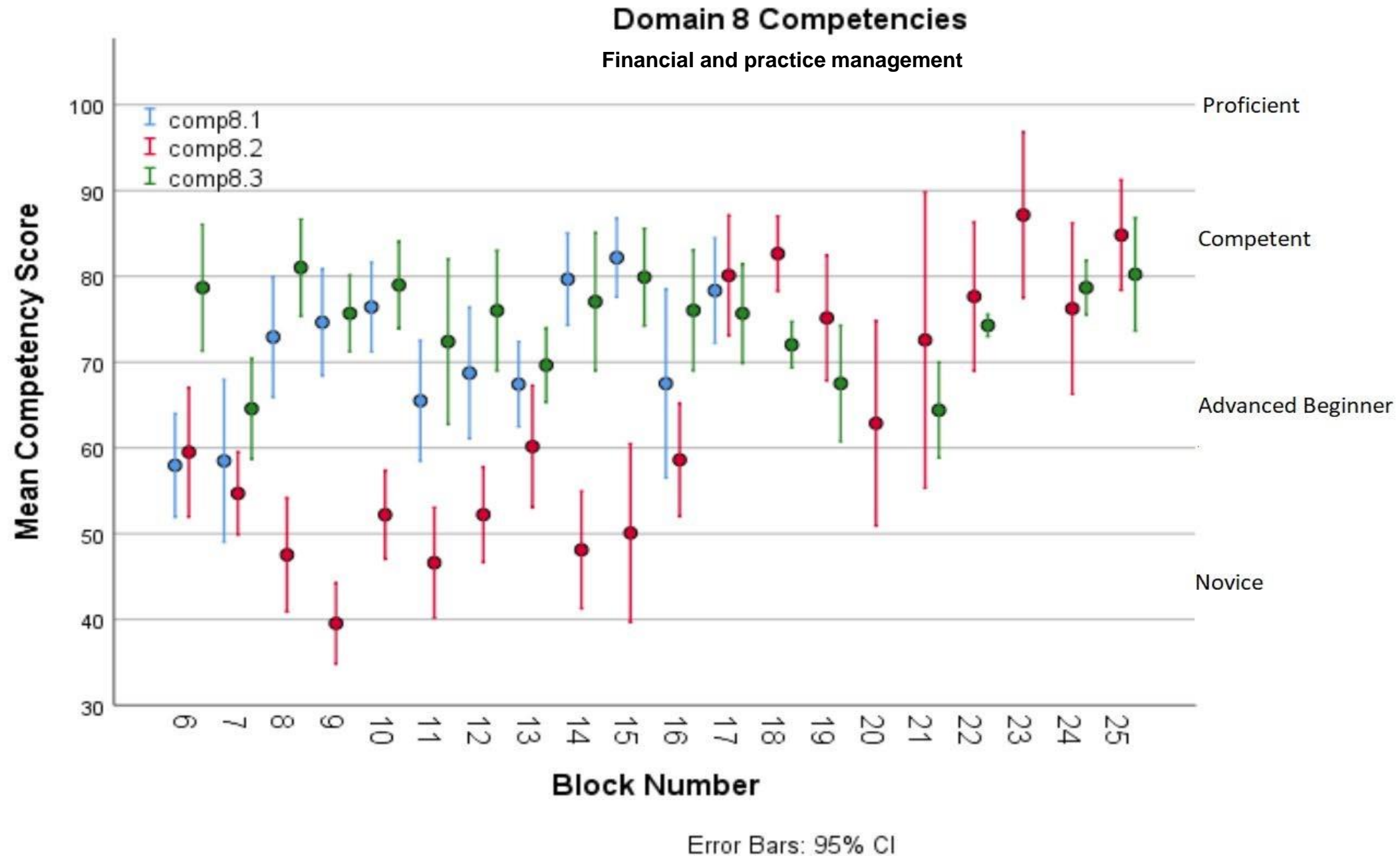
Summary of ITER Analysis – Domain 6



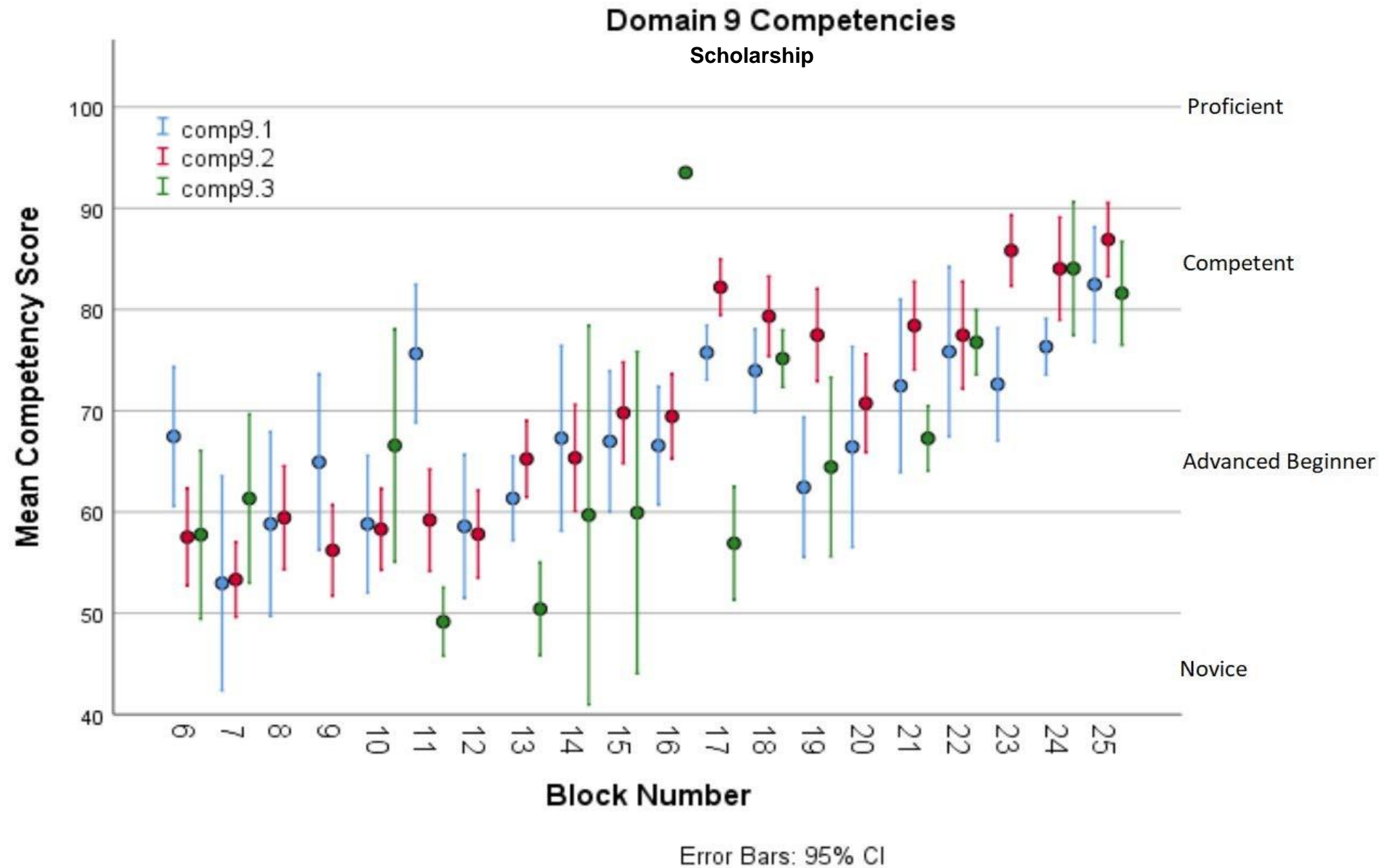
Summary of ITER Analysis – Domain 7



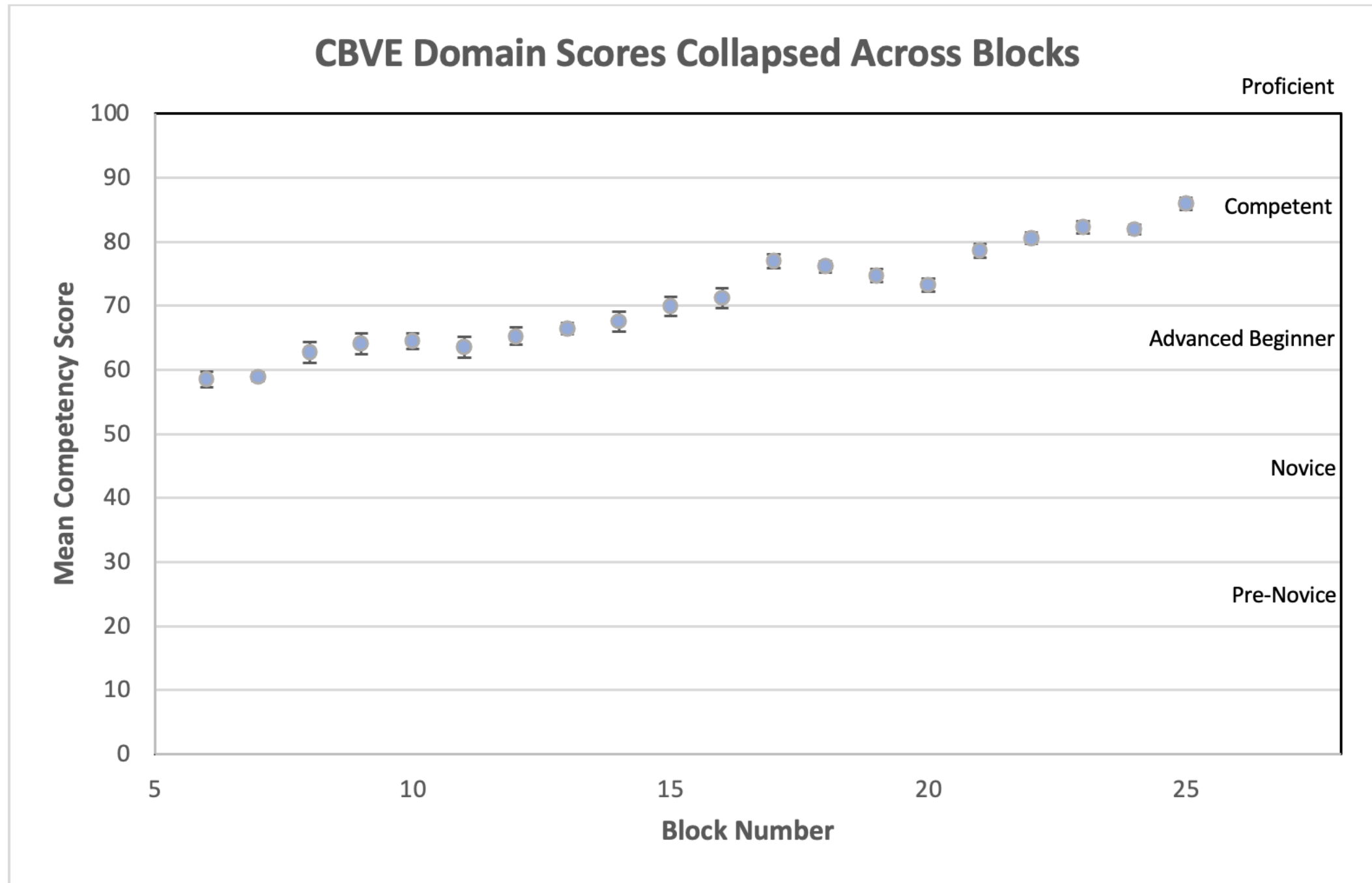
Summary of ITER Analysis – Domain 8



Summary of ITER Analysis – Domain 9



Summary of ITER Analysis – All Domains



Summary of ITER Analysis

Competency	No. Observations	No. Students	No. Raters	Mean no. assessments/student	Mean no. ratings/rater
1.1	5075	198	140	26	36
1.2	5075	131	30	5	20
1.3	5042	131	30	5	20
1.4	1960	131	30	5	20
1.5	1899	131	30	5	20
1.6	2140	131	30	5	20
1.7	2224	131	30	5	20
2.1	2584	81	4	3	66
2.2	526	81	4	3	66
3.1	206	12	4	3	9
3.2	37	12	4	3	9
3.3	647	12	4	3	9
4.1	299	68	8	3	26
4.2	271	68	8	3	26
5.1	5045	172	40	6	24
5.2	1848	172	40	6	24
5.3	2287	172	40	6	24
6.1	510	75	5	1	16
6.2	2989	75	5	1	16
6.3	793	75	5	1	16
6.4	306	75	5	1	16
7.1	226	100	12	2	19
7.2	5090	198	140	26	36
7.3	2632	198	73	13	36
7.4	2100	197	82	11	26
7.5	174	114	9	2	19
8.1	206	68	8	3	26
8.2	647	167	11	4	59
8.3	300	129	10	2	30
9.1	511	176	27	3	19
9.2	1580	196	51	8	31
9.3	70	60	2	1	35

Note:

There are **5** competencies that are observed on **ALL** rotations – 1.1, 1.2, 1.3, 5.1 and 7.2

Some competencies are not well reported in VME IV – few rotations observe them (e.g. 3.2)

- Domain 3 – Animal Population Care and Management
- Domain 4 – Public Health
- Domain 8 – Financial and Practice Management

Reliability

Domain	Cronbach's alpha
1 Reasoning and Decision making	0.993
2 Individual animal care	0.892
3 Animal population and care	-
4 Public health	0.887
5 Communication	0.967
6 Collaboration	0.898
7 Professionalism	0.916
8 Financial and Practice Management	(0.138)
9 Scholarship	0.749

- Reliability relates to the certainty with which a decision can be made about the student's performance on the basis of the test's results.
- Reliability is a property of the scores, not the instrument itself and gives an indication regarding the consistency of a particular measurement. Reliability coefficients range from 0 -1. The greater the number the more reliable the scores.

Reliability - G Analysis

- G-coefficient = 0.85 – Adequate reliability for milestone scores
- Student milestone ratings were consistent across competencies and blocks
- Greatest variance was accounted for by student within block (43.16%) (milestone scores consistently discriminated low scoring from high scoring students)
- Much less variance for competency within block (1.67%) or week of year (17.50%)
- Variation in students accounted for the greatest amount of variance

Random Coefficients Model

- Student y intercept accounted for the greatest variance (79.66%) – therefore students are starting at different milestones
- Students with highest milestone ratings have less change over time
- Milestone ratings between competencies often varied little between competencies per student
- Students progress at relatively the same rate over the year
- Majority of variance is due to student milestone ratings (45.03%)

How long does it take to get ITER data?

Rotation	Average # of Days ITERs completed after end of Block
ANES	20
APPL PATH	8
CARDIO	4
COMM PRACT	7
DERM	5
ELECT-BEHAV	0
ELECT-CLIN PATH	4
ELECT-COMPARATIVE PATH	2
ELECT-DIAG IMG	8
ELECT-EQ ANES	13
ELECT-NUTRITION	3
ELECT-PHYS REHAB	14
ELECT-ULAR	19
ELECT-ULTR SND	6
EQ COMM PRACT	13
EQ EMERG	7
EQ MED	11
EQ SURG	4
FAMS	9
LAFS	8
NEURO	4
ONCO	8
OPHTHO	4
RADIOL	5
SACC	6
SAER	8
SAIM	3
SAS-O	15
SAS-ONCO	6
SAS-ST	10
SMS	5
THERIO	6
Overall Average	7

Student Self Reflections

- Program Requirement – Each student must submit a self reflection at end of each semester
- Review all their ITER's and EPA's
- Rate themselves on the milestones for each domain based on what they 'see' in their evaluations
- Answer two questions:
 - a) What has been the most helpful ITER feedback given to you this semester in terms of helping your professional and personal growth, and why?
 - b) Based on all the feedback where will you focus your efforts for the rest of VME IV? Name the specific help or assistance you need to grow from here.

Review of Student Self Reflections

- Compared mean milestone rating per competency domain, for student vs. instructor
- Looked at milestone rating '**gap**' – how far apart was rating of student from instructors (ranged from -2 to +2)
- Looked at:
 - # of "U" grades achieved,
 - Any ITER flags received,
 - If there was a negative trend or positive trend over time (trending 'upwards' over milestones or not),
 - If they self-rated consistently higher or lower than they were evaluated by instructors
- Used to identify students that required further scrutiny or referral for coaching with final year teaching coaches (typically ~10%)

Introduction of EPA's



THE OHIO STATE UNIVERSITY
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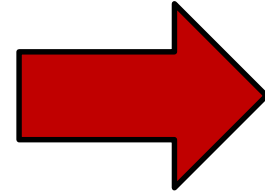
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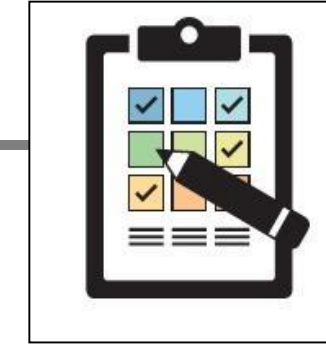
AAVMC
CBVE
Competency-Based
Veterinary Education

At OSU-CVM we split this into 3 parts:
a) Gather hx
b) Physical exam
c) Prioritized ddx list

Therefore, we have 10 EPAs that students can select from



EPAs	
1	Gather a history, perform an examination, and create a prioritized differential diagnosis list
2	Develop a diagnostic plan and interpret results
3	Develop and implement a management/treatment plan
4	Recognize a patient requiring urgent or emergent care and initiate evaluation and management
5	Formulate relevant questions and retrieve evidence to advance care
6	Perform a common surgical procedure on a stable patient, including pre-operative and post-operative management
7	Perform general anesthesia and recovery of a stable patient including monitoring and support
8	Formulate recommendations for preventive healthcare



OSU-CVM Entrustment Scale



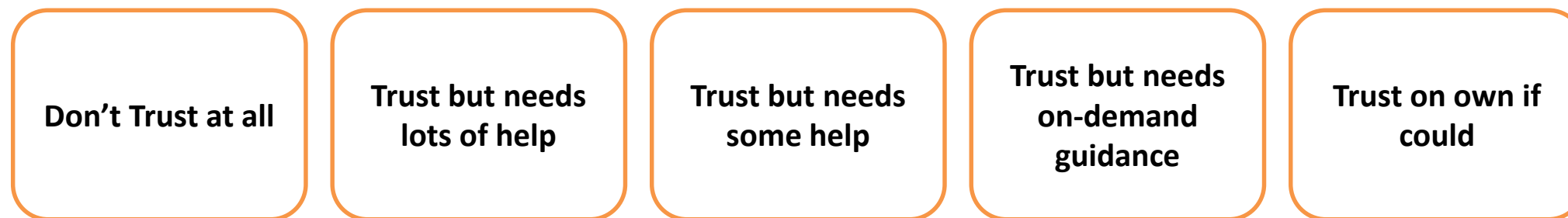
Based on similar scale derived and used at University of Calgary (UCVM)

	n/a	Don't trust to perform on own	Trust but needs lots of support to perform	Trust but needs some support to perform	Trust to perform alone
*Perform a complete physical examination	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

(Read EK, Brown A, Maxey C, and Hecker KG. Comparing Entrustment and Competence: An exploratory look at performance-relevant information in the final year of a veterinary program. JVME 2021, doi: 10.3138/jvme-2019-0128 advance online article)

OSU-CVM's Entrustment Scale

- Student initiates the interaction: "Can you please observe me doing an EPA?"
- Evaluator observes the student
- Student then rates self and completes comments – what went well, what could be even better yet

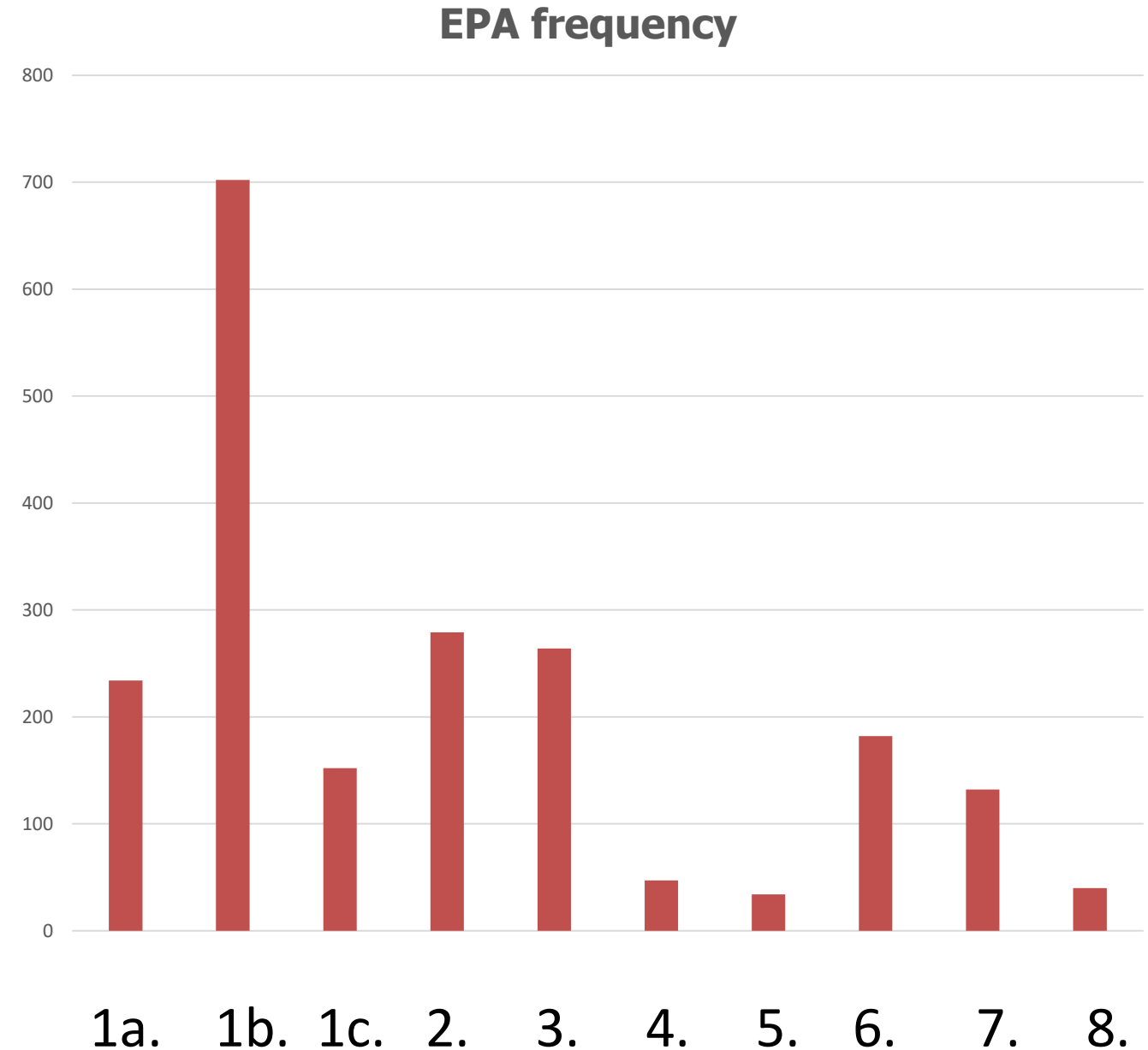


- Submits - bounces to evaluator
- Evaluator then rates student and completes comments – submits
- Both forms pop up on both devices – pair can have conversation about the EPA (low-stakes assessment)

Which EPAs are most frequently assessed?

- **EPA 1a** – Gather Hx, 234 (11%)
- **EPA 1b** – **Physical Exam, 702 (35%)**
- **EPA 1c** – Prioritized ddx list, 152
- **EPA 2** – Create dx plan and interpret results, 279 (13%)
- **EPA 3** – Develop and implement dx and tx plan, 264 (13%)
- **EPA 4** – Recognizing an urgent/emergent patient, 47 (2%)
- **EPA 5** – *Formulate relevant ?'s/retrieve evidence, 34 (1%)*
- **EPA 6** – Common sx proced, including mgmt., 182
- **EPA 7** – Perform general anesthesia and recovery, 132
- **EPA 8** – Recommendations for preventive health care, 40 (2%)

2799 forms collected for class of 2021



General Trends from EPAs

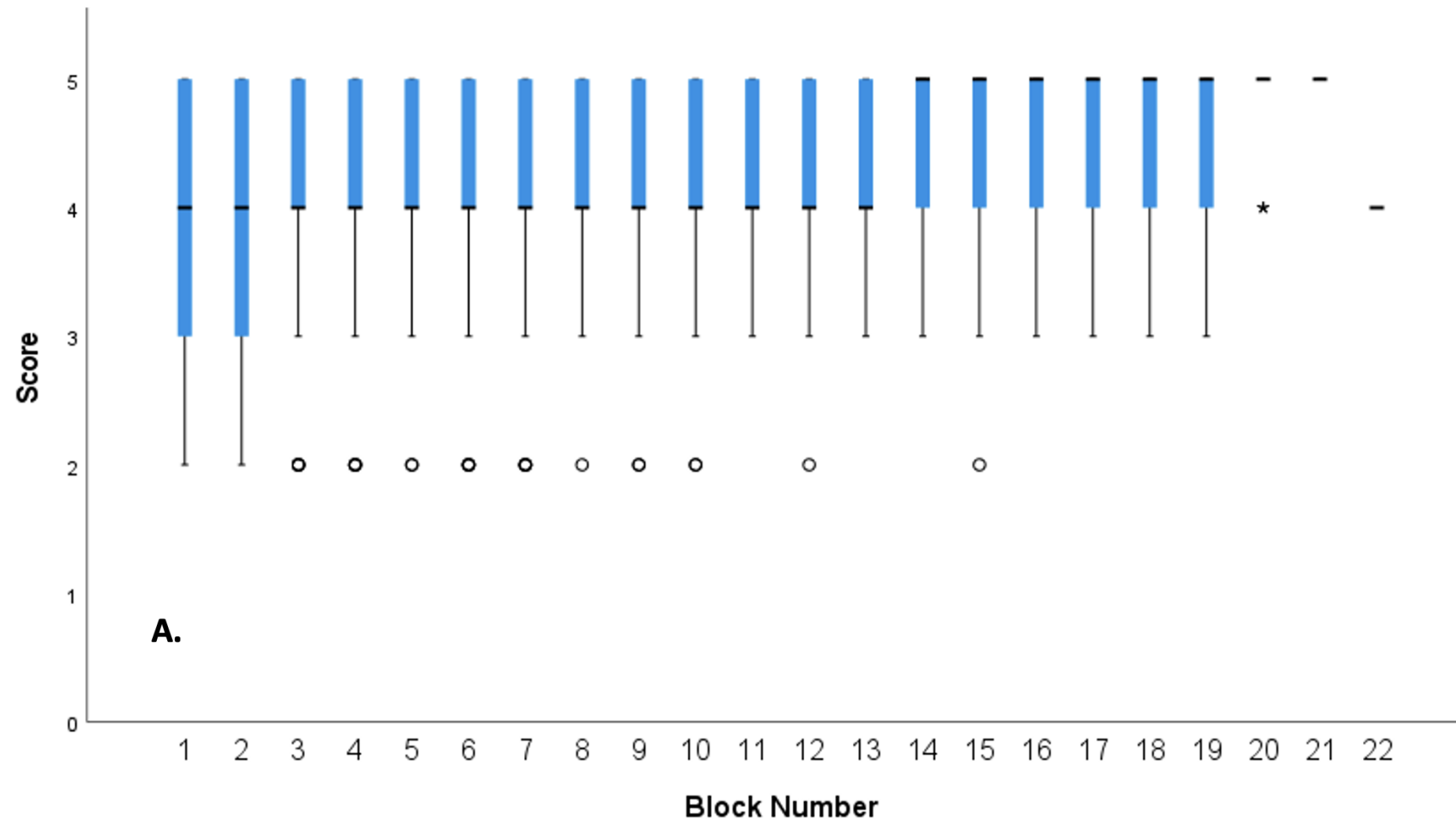
No one used "**1 - Don't trust to perform any aspect of the task**" (students or raters)

Early in year, students seem to rate themselves more highly than raters rated them.

Later in year, raters rated students more highly than students rated themselves.

74% EPAs complete within 24 hrs, <1% at 30 days.

Combined entrustment scores across all EPAs by rotation block



Analysis suggests little to no differentiation in entrustment scores over time – requires closer evaluation. Used as low stakes at OSU-CVM at present.

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Thank you!



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Part III: Question & Answer



How is your ITER
(or grading scheme)
similar or different from what
has been presented?

Please place your comments in the chat or unmute
and let us hear from you!



Would you be interested in a
standardized ITER for CBVE
(to use in clinical training)?

Zoom Poll



Thank you for your feedback!

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