

The Complexity of Care and the Dunning-Kruger Effect

SADJ February 2023, Vol. 78 No.1 p50- 55

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ABSTRACT

There appears to be an increase in litigation against general dental practitioners which is increasingly due to clinicians exceeding their competence, because they may not be aware that they lack the required skills: the so-called Dunning-Kruger effect. The purpose of this paper is first, to briefly explain the Dunning-Kruger effect, and second, to propose guidelines for dentists confronted with differing levels of complexity of care, in order to increase practitioners' awareness of their competence, and by extension, their limitations. An example of complexity levels is given using the discipline of Prosthodontics. It is concluded that there needs to be a revision of the scope of practice for dentistry, which currently provides an "anything goes" approach; a revision of Rule 21 of the Health Professions Council of South Africa, whose provisions need to be more precise as they are currently being ignored; and a revision of the system of providing accreditation for CPD courses and in particular for the presenters and content of those courses.

INTRODUCTION

There appears to be an increasing need to protect patients from clinicians who may exceed their capabilities within their training and experience, because they may not be aware that they lack the required skills: the so-called Dunning-Kruger effect. A professional liability company, Dental Protection (a subsidiary of the Medical Protection Society) has expressed concern at the observation that many South African dental practitioners appear to be exceeding their competence. They have identified increasing numbers of cases involving the following (personal communication, McKenzie A):

- Accidental or unplanned re-organised occlusions
- Unethical treatment decisions
- A complete failure to apply correct occlusal principles
- No records, no study casts analysed on a semi-adjustable articulator
- No adequate temporisation
- Irregular lower incisors restored with heavy prep veneers where the final result is aesthetically level and aligned incisor edges but no attention given to the creation of an unplanned anterior guidance and then subsequent failure
- Vertical dimensions increased

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It is proposed here that there is a need for guidelines to help reduce human error, assist with greater consistency of outcome and to improve the overall standards of care provided by general dental practitioners. Such guidelines would not limit dentists who are capable and competent in performing clinical work at higher levels. The purpose of this paper is first, to briefly explain the Dunning-Kruger effect, and second, to propose guidelines for dentists confronted with differing levels of complexity of care.

THE DUNNING-KRUGER EFFECT

This term has evolved from a paper published in 1999 by two psychologists from Cornell University.¹ The first words of its title were "Unskilled and Unaware of it" and it was described as "an exploration into why people tend to hold overly optimistic and mis-calibrated views about themselves". Their hypothesis was that people tend to hold overly favourable views of their abilities in many social and intellectual domains, and those with limited knowledge in a domain suffer what they referred to as a dual burden: they reach mistaken conclusions and make regrettable errors; and they do not realise this precisely because of their lack of knowledge and competence. Put in psychological terms, they lack metacognition, which is the ability to be aware of and understand one's own thought processes.^{2,3}

Kruger and Dunning tested their hypothesis that being unable to recognise one's level of ability is related to (in)competence, and that this may be due to a lack of metacognitive skills, by testing individuals in three situations. They asked participants to estimate their ability relative to a set of objective criteria; to recognise their own or others' competence; and to estimate their performance relative to others'. In addition, they tested whether providing metacognitive skills would assist in gaining a better insight into their own competence. This paper will not reproduce all their findings, but will summarise some examples to illustrate their conclusions.

The first example was of participants' perceived ability to recognise humour: the authors drew up a 30-item questionnaire of jokes they described as having "varying comedic value" as determined by professional comedians who rated them from not at all funny to very funny on a 10-point scale. The participants then had to do the same, and were then asked how they thought they did on a percentage basis from 0 (I'm at the very bottom) to 50 (I'm exactly average) to 99 (I'm at the very top). Fig. 1 shows their perceived scores against their actual scores. Congruence is only reached for those who scored correctly, in the top quartile, where they mostly under-estimated their scores. Those who scored poorly were completely oblivious to that fact.

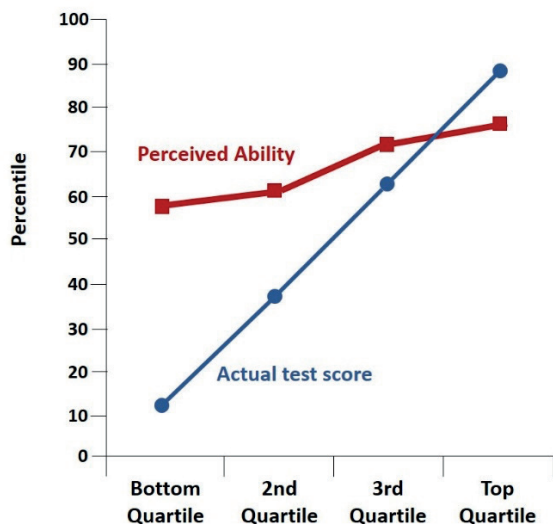


Fig. 1 Perceived ability to recognise humour as a function of actual test performance (redrawn from Kruger and Dunning 1999¹)

Another example is a test of logical reasoning where this time the participants were asked to score not only their perceived ability but also what percentage score they felt they had achieved in the test. This was again mapped against their actual scores, as shown in Fig. 2.

Since that seminal paper, many others have looked for similar effects, and this phenomenon of not knowing what you don't know has been illustrated in many domains.⁴⁻⁸ The question of how to overcome this was also addressed by Kruger and Dunning¹ and by others since^{7,9,10} with mixed success (and some ironic conclusions). In the original study, Kruger and Dunning¹ found that in a test of logic, the bottom quartile of participants who received training reduced their over-estimation of test performance compared with those who did not receive the training. The authors concluded that this might be that the training improved their metacognition and thus moved them into the competent realm. However, in a study on emotional intelligence, participants after receiving their result were asked if they wanted to purchase a book which would improve their self-knowledge at a 50% discount. Of those in the top quartile, 64% wanted the book, but only 19% of those in the bottom quartile did.⁹ So pointing out people's deficits did not necessarily induce them to strive to overcome those limitations. This was confirmed in a study among people with a known bias, which concluded that they were either indifferent or unaware of their own bias, and that if one is to improve, one needs to recognise the need for improvement but that "those who would benefit the most ... are the ones who are least likely to do so".¹⁰

So, if you don't know what you don't know, how will you know when you have exceeded what it was you thought you knew? Despite the somewhat sceptical conclusions of the studies quoted above, I would suggest that there are two ways to increase peoples' awareness of their competence, and by extension, their limitations. One would in fact be to educate them, preferably by their volunteering for such education, and the other, associated way, is by categorising what they do into levels of complexity and insist that further education is required to move from one layer of complexity to another. This in effect, is one of the goals of Continuing Professional Education, but at present its unregulated manner and its lack of linkage to tests of competence (other than the negative

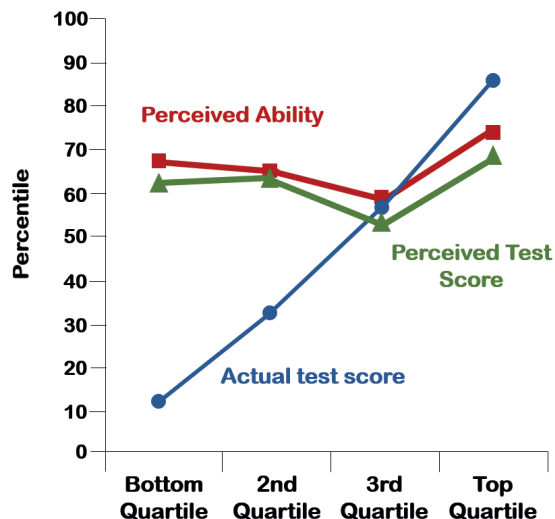


Fig. 2 Perceived logical reasoning ability and test performance as a function of actual test performance (redrawn from Kruger and Dunning 1999¹)

effect of litigation) seems to have missed that goal. Guidelines in the form of a categorisation of treatment need into complexity categories will serve a variety of purposes; they will:

- Protect patients from incompetent or negligent dental practitioners;
- Capacitate dental practitioners to identify / recognise their clinical limitations / skills, thereby enabling them to decide who is the most appropriate and adequately qualified clinician to provide the care for their patients;
- Provide a competency framework against which a dentist's conduct can be evaluated by the regulator, the Health Professions Council of South Africa (HPCSA) and professional experts called on when complaints / claims are made;
- Provide a framework that will help the profession identify where additional training and and/or qualifications are required; and
- Provide a means of identifying a reasonable expected standard of care at each level of complexity.

It must be emphasised, though, that if the profession and the regulator accept these guidelines and complexity levels, they must guard against their possible abuse by third part funders who may abuse the guidelines to restrict some treatments that are currently open to all. This applies also to the National Health Insurance fund and is not the intended use and must be vigorously opposed should this happen.

SCOPE OF PRACTICE: DENTAL PRACTITIONERS CAN DO EVERYTHING

The scope of practice of dental practitioners is defined in the vaguest possible terms by the National Department of Health as set out in Regulation R238 in Government Gazette 31958 of 6 March 2009. The scope is 'defined' as follows:

"The following acts are hereby specified by the board under section 33 as acts which shall, for the purposes of the Act, be deemed to be acts pertaining to the profession of dentistry:

- (a) The physical clinical examination of the oral, maxillofacial and related structures of a person;
- (b) making a diagnosis of diseases, injuries and conditions

- of the oral, maxillofacial and related structures, including determining the relevance of systemic conditions, and/or giving advice on such conditions;
- (c) performing dental procedures and/or prescribing medicines aimed at managing the oral health of a patient, including prevention, treatment and rehabilitation;
 - (d) performing any procedure on a patient aimed at fitting or supplying a dental prosthesis or appliance; and
 - (e) performing any aesthetic or cosmetic procedure on a patient pertaining to the oral and peri-oral area.”

This creates a huge ethical dilemma, in that there would appear to be no limit to what a dental practitioner can do, as no actual procedures are specified. I would suggest that these regulations need to be urgently revised and that procedures and their complexity rather be specified. In the meantime, it is suggested here that a way around this might be what is presented here as complexities of treatment need.

COMPLEXITY OF TREATMENT NEED

Defining complexity levels is not new. The UK's National Health Service has used this primarily as a means of identifying what types of treatment would be referred into secondary care pathways.¹¹ It also gave the specialists a framework of referral criteria. However, for South Africa, the need is slightly different, and the emphasis, it is suggested, should rather be to help the clinician identify who is the best person to treat the patient and identify what additional skills are needed to attempt specific procedures or to carry out more complex treatment or treatment involving newer technologies. Therefore the assessment of complexity is related to the credentials of the clinician, and this should guide the determination of whether a practitioner may have exceeded their level of competence.

LEVELS OF COMPETENCE/EXPERIENCE/ TRAINING

The complexity assessment is related to the following levels of experience/training:

- Complexity Level 1: A registered dental practitioner with no additional degrees or diplomas or training.
- Complexity Level 2: A registered dental practitioner who has undergone training and/or gained experience in the particular discipline or area.
- Complexity Level 3: A registered dental specialist.

TRAINING AND EXPERIENCE

Moving from complexity level 1 to level 2 would require further training and/or experience. This of course is very difficult to define, and the only official guideline available is under Rule 21 of the HPCSA. This rule, though, is aimed more at the medical profession and certainly was not made with dentistry in mind, as some of its provisions are impossible to comply with. Rule 21 is the “Performance of Professional Acts”: “*A practitioner shall perform, except in an emergency, only a professional act... for which he or she is adequately educated, trained and sufficiently experienced*”. In 2014 the Council's Human Rights, Ethics and Professional Practices Committee published an interpretation of Rule 21, which is reproduced in the box.

For example, with reference to clause iii,cc there is no definition of what number of interventions defines proficiency (the same dilemma undergraduate curricula have), and both this and clause ii,ee provide no definition of the “standards and norms considered reasonable”. This should be of great concern to the profession and to the Medical and Dental Professions Board of the HPCSA, but appears not to be. Equally important is the question of what constitutes being appropriately educated and credentialed, because the interpretation seems to imply

Box 1: Interpretation of Rule 21 of the of the generic ethical and professional rules of the HPCSA as promulgated in government gazette R717/2006

INTERPRETATION OF RULE 21

i. Emergency intervention

In an emergency, where there was a direct threat to life or limb and there is no immediate access to a more appropriately trained healthcare worker, then the healthcare worker should intervene to the best of his/her ability.

ii. Appropriately educated and credentialed

To qualify as appropriately credentialed, the individual practitioner must have successfully completed a training programme approved and accredited by the Board for registration purposes:

- aa. The training entity/institution/hospital needed to be accredited for training in that particular profession or discipline and for that particular competency (in this case, by the Board).
- bb. The trainee needed to be evaluated and certified as having met the requirements of the training programme by an entity accredited by the Board (e.g. Colleges of Medicine, Universities).
- cc. The duration of under- and postgraduate training was laid down by the Board.
- dd. Short courses would only be recognised as enhancing or maintaining skills within the field of practice and category of registration in which the practitioner had already been credentialed and registered by the Board.
- ee. The actual scope of the profession was laid down by the Board judged by the standards and norms considered reasonable for the circumstances under which the intervention took place.

iii. Sufficiently experienced

- aa. Initial training period under the supervision as defined in clause (b) above, under the supervision of an entity accredited by the Board for such purposes.
- bb. Certification of successful completion of such training, as defined.
- cc. With any intervention a minimum number of interventions needs to be performed annually to remain proficient, taking into account and judged by the standards and norms considered reasonable for the circumstances under which the intervention took place
- dd. The introduction of new interventions within the practitioners' scope of profession was only permissible if the practitioner had undergone further appropriate training as approved by the Board.

iv. Under proper conditions and surroundings

All interventions shall take place under appropriate conditions and surroundings. These are subject to judgement by the Board as to what is considered reasonable for the circumstances and conditions, under which the intervention took place. No practitioner must embark upon an intervention unless he/she feels that it is in the patient's interest, and that it would be considered safe to do so, under the prevailing conditions and surroundings. The practitioner would be judged on what requirements would be reasonable to ensure that patient safety was protected.

that all training (a) has first to be accredited by the Board (clause ii,aa) and (b) must be evaluated and certified (clause ii,bb). It appears that these provisions have been, and continue to be, ignored by both the profession and the HPCSA, for according to these provisions, all CPD courses must be accredited, evaluated, and certified, and carried out only by an entity/institution/hospital that has been accredited. I know of no such courses other than the postgraduate courses offered by our dental schools that lead to postgraduate Diplomas or Masters degrees. Does this make all CPD courses redundant?

It would appear that currently, the CPD courses offered are largely industry- and/or profit-driven. Furthermore, there has been much discontent among the dental specialist societies about the content of many of these courses, and the credentials of those offering such courses. For example this prompted one such society, the Academy of Prosthodontics of South Africa, to issue a statement in 2018 as reproduced in the second box. Needless to say, the South African Dental Association (SADA) completely ignored this, and the trend is continuing.

AN EXAMPLE OF PROCEDURES AND COMPLEXITY LEVELS: PROSTHODONTICS

The following list is an example of what treatments could be placed in the proposed three levels of complexity for Prosthodontics. It is merely presented here as a polemic and suggestion for further debate. In line with the levels used in the UK, there are also under each discipline, what are referred to as Modifying Factors. These are patient and other factors that may increase the complexity of the treatment such that referral to a higher level is required. These will be listed for each discipline. Generally the referral will be to Level 3 (dental specialist).

BOX 2. APSA position statement on general dental practitioners teaching other dental practitioners (JULY 2018)

There appears to be an increasing trend for CPD courses that are being taught by general dental practitioners, and that often seem to include specialist content. APSA finds this situation unacceptable, unless those teaching the courses have ensured that they are properly credentialed according to the guidelines of the Health Professions Council of South Africa pertaining to Rule 21 of the Ethical Guidelines.

Although we acknowledge that this rule relates to the "Performance of Professional Acts", we believe it should also be applied to those giving training and/or courses, as these almost always include instructions on the performance of clinical procedures; and these are "professional acts". The consequences of this are that general dental practitioners may be provided with incorrect information or inappropriate instructions for treatment which can and will have adverse consequences for their patients.

APSA therefore believes that a person providing training, or courses, should, according to the guidelines, be "Appropriately educated and credentialed" and "Sufficiently experienced" as defined by those guidelines.

Furthermore, it seems that the accreditation bodies are either ignorant of these guidelines or choose to ignore them when awarding CPD points for participation.

APSA therefore calls on SADA, and any other agency providing CPD accreditation, to more strictly apply the Rule 21 guidelines to presenters of courses or training.

REMOVABLE PROSTHODONTICS

Modifying Factors for Removable Prosthodontics: refer to Level 3, dental specialist

- Alteration in the occlusal vertical dimension required
- Significant tooth surface loss
- Hyposalivation, Xerostomia
- Special needs patients
- Maxillofacial prostheses
- Oro-facial dystonias
- Atypical or undiagnosed facial pain
- Limited operating access
- Concurrent mucogingival disease (e.g. Lichen Planus)
- Coordinated medical (e.g. renal, cardiac) and/or dental multi-disciplinary care
- Medical history that significantly affects clinical management:
- Patients requiring IM or IV medication as a component of clinical management.
- Patients with a history of head/neck radiotherapy.
- Patients who are significantly immuno compromised or immuno suppressed.
- Patients with a significant bleeding dyscrasia/disorder.
- Patients with a potential drug interaction.

REMOVABLE PARTIAL DENTURES

Complexity Level 1

Acceptable prostheses with adequate evidence from the literature:

- Removable partial dentures with acrylic bases and tooth support
- Removable partial dentures with a metal framework and tooth support (other material such as PEEK for frameworks have insufficient evidence at the time of writing)

Unacceptable prostheses because of evidence from the literature or insufficient evidence:

- Removable partial dentures made from thermoplastic resins
- Removable partial dentures with no tooth support
- Unilateral removable partial dentures

Complexity Level 2

- Removable partial dentures supported in part by implants (such as mandibular distal extension bases)

Complexity Level 3

- The use of extra-coronal restoration to provide retention and support (e.g. milled ceramo-metal or metal restorations, use of precision attachments).
- Dual-path insertion removable partial dentures
- Swing-lock and sectional dentures
- Associated with maxillofacial prosthodontics for cranio-facial defects

COMPLETE DENTURES

Complexity Level 1

- Patients requiring mucosa-borne complete dentures with uncomplicated alveolar resorption patterns
- Patients with a history of successful complete denture wearing

Complexity Level 2

- Patients with Cawood and Howell Class V and VI ridges

- Patients with Cawood and Howell Class V and VI ridges who have been unable to wear dentures made at Level 1

Complexity Level 3

- Patients who have been unable to wear dentures made at Level 1 or 2
- Tooth and implant-supported overdentures when planned after providing diagnostic dentures and in association with a surgical discipline
- Maxillofacial prosthetic patients requiring complete dentures with obturators, speech bulbs, etc.

FIXED PROSTHODONTICS

Modifying Factors for Fixed Prosthodontics: refer to Level 3, dental specialist

- Reorganisation of the occlusion required
- Alteration in the occlusal vertical dimension required
- Radiographic evidence of 50% reduction in bone support
- Skeletal base alveolar discrepancy that adversely affects the occlusion
- Significant tooth surface loss
- Hyposalivation, Xerostomia
- Special needs patients
- Oro-facial dystonias
- Atypical or undiagnosed facial pain
- Limited operating access
- Concurrent mucogingival disease (e.g. Lichen Planus)
- Coordinated medical (e.g. renal, cardiac) and/or dental multi-disciplinary care
- Medical history that significantly affects clinical management:
 - Patients requiring IM or IV medication as a component of clinical management.
 - Patients with a history of head/neck radiotherapy.
 - Patients who are significantly immuno compromised or immuno suppressed.
 - Patients with a significant bleeding dyscrasia/disorder.
 - Patients with a potential drug interaction.

Complexity Level 1

- Anterior indirect veneers
- Crowns where the external surfaces can be guided by the existing teeth, in shape and form, and to maintain and be in harmony with anterior guidance and where applicable, with the existing excursive tooth contacts
- Posterior intra- and extra-coronal restorations where there are sufficient remaining teeth to guide the occlusal anatomy of the restoration to be in harmony with the existing occlusion.
- Fixed partial dentures (bridges) of a maximum of 4 units (as taught at the undergraduate level).

Complexity Level 2

- Single restorations on an implant
- Three- or 4-unit fixed partial denture on implants
- One- or two-implant-supported overdentures

Complexity Level 3

- All fixed partial dentures (bridges)
- Periodontal-Prosthetic prostheses
- All implant-supported restorations
- Restorations replacing the complete anterior guidance

dentition (maxillary or mandibular or both)

- Restorations requiring a re-organised occlusal scheme
- Restorations associated with maxillofacial prostheses

CONCLUSIONS AND RECOMMENDATIONS

There is much that is wrong with the current state of education, training and treatment provision in the profession of dentistry in South Africa at present, as evidenced by increasing litigation which is highlighting treatments being provided by practitioners exceeding their competence yet being unaware or unconvinced that they are doing so.

The scope of practice of dentistry as defined by the National Department of Health is vague and implies an “anything goes” approach. This is somewhat mitigated by ethical rule 21 of the HPCSA pertaining to the “performance of professional acts” but is complicated by further vague and unsubstantiated provisions in the HPCSA’s interpretation of that Rule. Further, this has allowed the unregulated accreditation of CPD courses being presented by insufficiently credentialed presenters as defined by that interpretation.

The suggestions made in this admittedly polemic paper are made with a view to improving this unsatisfactory situation and the Dunning-Kruger effect has been used to help illustrate the problems, and provide solutions that will hopefully obviate the observations that some practitioners are indeed exceeding their levels of knowledge and skill.

The following recommendations are therefore made:

1. Levels of care and procedures of increasing complexity should be defined for every discipline (such as in an example given in this paper);
2. The interpretation of Rule 21 should be revised as a matter of urgency, as its provisions need to be more precise and are currently being ignored;
3. The system of providing accreditation for CPD course be urgently reviewed: at present apart from the dental schools, the only accreditor is the South African Dental Association, and as an association largely of and for dental practitioners, this is a clear conflict of interest. The evidence of inappropriate awarding of CPD points is manifest and abundant.

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