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Education Section

Structured Reflection with Self-assessment Rubrics: A Study Report on Dental Students Expression, Experience, and Perceptions about Reflective Practice

K ANBARASI[1], PV VIJAYARAGHAVAN[2], RAVICHANDRAN LATHA[3], DEIVANAYAGAM KANDASWAMY[4], L KANNAN[5]

ABSTRACT

Introduction: The clinical competence is supported by reflective practice by assisting the beginners to analyse their progress and update their capabilities.

Aim: To introduce Structured Reflection with Self-assessment Rubrics (SRSR) for dental undergraduates and to determine its effectiveness in enhancing the participant's clinical competence and students' perspectives about reflective practice.

Materials and Methods: A non-randomised experimental study was carried out consecutively for four academic years. Using purposive homogeneous sampling methods, 247 internship students were included in the study. A structured reflective worksheet was designed by focusing on seven essential domains of dental practice and each participant was asked to reflect on 12 clinical procedures during their internship period. The self-completion survey was conducted using a close-ended questionnaire to predict the participants' experience and a 5-point Likert's scale feedback questionnaire to analyse their perceptions and attitudes toward reflective practice.

Results: Statistical analyses of the survey results revealed that 72% of the total participants accepted that structured reflective practice enhanced their self-directed learning and made them provide high-quality patient care. About, 75% of the participants expressed their interest in adopting the reflective practice in their upcoming learning activities. Interestingly, 57% of the participants stated that they experienced a mismatch between idealism and reality when practising structured reflection in a clinical environment. However, 64% of the present total participants strongly agreed on the importance of reflective practice in clinical training.

Conclusion: Based on the study results, authors ensure the effectiveness of structured reflection in enhancing dental student's clinical competence and their positive attitude towards the reflective practice.

Keywords: Clinical competence, Educational measurement, Feedback

INTRODUCTION

Dental education is a complex process that involves concurrent learning and clinical practice to become competent dental practitioners. Dental students depend on the feedback of their instructors and on a grading system to monitor their progress [1]. Self-analysis of one's performance is a direct and honest method of testing the growing competency over the course of the learning. In this context, reflective practice is a "meta-competence" (knowledge and the use of one's own competencies to optimise learning and problem-solving behaviour) that assists learners to integrate the affective aspects of their learning [2]. This may be beneficial in a clinical learning environment where several aspects of a student's forthcoming professional responsibilities can be experienced [3]. A background report on evolution of reflective practice is essential for the understanding of reflection in the context of students training.

Reflection and Reflective Practice

Dewey J, described reflection as the "active, persistent, and careful consideration of any belief or hypothetical knowledge in the light of the grounds that support it and the further conclusions to which it tends" [4]. Since the time of Dewey J, there has been extensive ongoing research on reflection and several researchers have used the terms. Schön DA, conducted a need analysis exercise and interpreted the relationships between reflective practice, learning experience, and performance improvement [5]. Boud D, acknowledged that significant reflective practice enables students to think and act towards practice-based learning throughout the course of the study [6]. Mann K et al., stated that reflection could be a self-supporting guide for novice learners to recognise their knowledge, strengths, and weakness, and improve their learning outcomes [7]. Johns C, characterised reflection as a personalised process in which a person can assess, understand and learn through experience, and generate new learning opportunities [8]. Ghaye and Lillyman, mentioned five different reflection, structured (using a set of questions to guide reflection), hierarchical (training students through consecutive reflective practice), iterative (reflecting on the results of previous experiences and implementing it on the newer practice to reach the expected level of outcomes), synthetic (summarising and linking different events or information to decide the performance outcome), and holistic (reflecting on personal values and beliefs) [9]. Gibbs G, model is a six steps structured reflection comprising description, feelings, evaluation, analyses, conclusion, and action plan [10].

The structured reflection process aims to examine what happened and then reform what is happening, to best facilitate progress or change something for the next opportunity [11]. Jones C, recommended a rigorous model of structured reflection for beginners. [12]. The time at which reflection happens also establishes two types, the "reflection-in-action," refers to reflection during the act and the "reflection-on-action," refers to the reflection after an action has been performed [5]. The "reflection-on-action" is a retrospective process that attempts to look back, analyse and review an event to determine what aspects led to performing the actions. Reflection-for-action is the visionary thinking about how to improve the performance in the forthcoming practice [13].

Reflective Tools

Numerous researchers have highlighted several design problems of reflective tools [14]. Using reflective portfolios [15], reflective essays

[16], and journal writing [17] often lead to the experience of fatigue and disinterest in the reflection's act because of time pressures, variations among the learning styles, and a lack of supervision [18]. However, there is no single most appropriate tool for guiding productive reflection, and therefore it is appropriate to design a reflective tool according to the requirements.

Despite the proven benefits of reflective practice in educating health professionals, there are minimal documents on the effectiveness of this technique in dentistry. The reasons for this lacuna include the supervised nature of clinical training, performance-based assessment system and use of logbooks and portfolios for measuring the outcomes. The lack of training in reflection and self-assessment practice in dental education affects organising skills and strategic thinking among students [19].

To overcome this, authors conducted a study to determine the effectiveness of structured reflection in enhancing dental students learning through self-analysis and their perception of reflective practice with the following objectives.

- To introduce structured reflective worksheets to implement reflection-on-action practice among undergraduate dental students.
- To determine the impact of reflection using a self-completion questionnaire survey on a) the participant's experience; and b) the participant's perception
- To determine the effects of reflection in enhancing the student's clinical competence by analysing the worksheets.
- To plan for a self-assessment rubric to help the participants in identifying their learning outcomes. (Competent-able to perform the task at the predetermined standards, incompetent-systematic training is mandatory for reaching competency, nearly competent-the need for further skill refinement).

MATERIALS AND METHODS

The sample size was calculated using a Master Software version 2.0. A total response rate of 87% from a previous study was considered for sample size calculation [20]. By keeping the confidence level at 95% (α) and power at 90%, total sample size got after considering 5% attrition was 250. Authors identified dental undergraduate students in their internship phase as an appropriate study population. The principal investigator explained the study purpose and protocol to all the internship students. Purposive homogeneous sampling was adopted without controls for sample size calculation. Authors recruited 247 internship students from four consecutive academic year batches (2013-17) for the study after getting their volunteer oral consent [Table/Fig-1]. A sensitisation program was conducted for each batch participants about the reflective domains, how to reflect on these domains, how to be specific in descriptions, and how self-assessment can determine the progress. The institutional ethics committee approved this proposal as a part of competency-based clinical dental education.

Study Design

A structured reflective worksheet was designed by focusing on six essential domains dictated by the Dental Council of India [21] (history taking, clinical examination, reasoning and problem-solving skill, procedural skill, treatment process, and learning outcomes) to link the practitioners' experience with the expected performance [Table/Fig-2]. A team of three faculty members from different specialities (clinical psychology, Dentistry, and Medicine) reviewed the worksheets independently, and they established the content validity of the worksheet. Authors completed a necessary revision of the worksheet, completed after considering the feedback of the reviewers.

A self-assessment rubric was prepared to provide general guidance for the students to assess their successive learning outcomes (competent, incompetent, or nearly competent) [Table/Fig-3].

To recognise the participants' experience and their perceptions about reflective practice, we designed and implemented a close-ended questionnaire [Table/Fig-4] and a five-point Likert's scale response questionnaire [Table/Fig-5]. A team of six faculty members was asked to review and validate the self-assessment rubric, close-ended and five-point Likert's scale response

S. No	Academic year	Male			Female			Total participants	
		Age (Mean±SD)	(No of participants)	Percent	Age (Mean±SD)	(No of participants)	Percent	Total	Percent
1	2013-14	21±1.5	12	18	21±1.5	54	82	66	100
2	2014-15	21±1.8	19	33	21±2.0	38	67	57	100
3	2015-16	21±1.1.5	18	29	21±1.8	45	71	63	100
4	2016-17	21±1.0	14	23	21±1.1.5	47	77	61	100

[Table/Fig-1]: The details of the participants.

S. No	Reflection domains	Reflect on your experience and feeling in a prescriptive manner	Reflection for action (decisions of future action)
1	Description of patients presenting illness and expected dental care		
2	Clinical findings and proposed treatment plan		
3	Reasoning and problem-solving ability (analyse the risk and benefit of proposed treatment plan, including drugs prescribed, and anticipate the most appropriate outcome)		
4	Skill: Procedure Appropriate usage of armamentarium ✓ Proper selection and usage of dental materials ✓ Executing the procedure ✓ Matching with checklist criterion for the particular performance		
5	Skill: Product ✓ Self-evaluation of the treatment process (duration, flow of events, patients satisfaction, and unexpected events if any)		
6	Learning outcome about professional standards, ethics, and an added notes on the most satisfied component		
7	Need for any support or assistance to progress in a specific skill that was accomplished in this procedure, if yes, please specify		

[Table/Fig-2]: Structured reflective worksheet developed for the clinical dental practice.

S. No	Reflective domain	Competent	Nearly competent (need refinement)	Incompetent (need meticulous training)
1.	Description of the patient's chief complaint, presenting illness, and expected dental care	Patient's chief complaint, course of illness, expectations, and treatment needs are well-recognised and complete	Isolated facts of the illness and patient's requests were determined	Failure to recognise the patient's illness and expectations
2	Clinical findings, investigations, and proposed treatment plans in justification with patients age, systemic health, and so on	Intra-oral examination revealed, the normal anatomy, anatomical variants, and pathological findings are precisely identified in clinical, radiographic and lab reports. Developed a comprehensive treatment plan and alternatives suitable for the patient's systemic condition, age and other concerns	Recognised normal anatomy and anatomical variants Successfully determined some but not all significant findings in clinical examination, radiographic interpretation and lab reports. Developed a comprehensive treatment plan. Alternate options are inappropriate	Missing details in clinical findings, Failed to list the necessary findings from radiographs and/or lab reports Developed a vague, indecisive treatment plan Failed to formulate the alternative treatment options
3	Reasoning and problem-solving skill.	Analysed the risks and benefits of the proposed treatment plan, including drugs prescribed, and concluded the most appropriate expected outcome.	Analysed the basic risks and benefits of the proposed treatment plan. Clearly stated the related outcomes.	The treatment plan is improper with an inaccurate analysis of the risks and benefits. The intended outcome is omitted.
4	Skill: Procedure Appropriate usage of armamentarium	The effortless implementation of fine motor skills in an indirect approach treatment process. Appropriateness in the selection and usage of dental materials Followed the sterilisation and infection control protocols Maintained cleanliness in the working premises and equipment. Accomplished the criterion in the standardisation checklist for a given procedure	Generally accurate. Few significant errors in the manipulation/usage of dental materials. Attempted to follow the sterilisation protocol initially but not maintained the standards throughout the procedure. The satisfactory level of cleanliness was maintained. The checklist criterion was mostly fulfilled but not complete.	Some involuntary errors in fine motor skills (e.g., handling rotary instruments, recording the jaw relation, and so on) Sterilisation and infection protocols are not followed effectively. Inadequate cleanliness. Performance standardisation level is attained only at the surface level.
5	Skill: Product Self-monitoring and evaluation of the treatment process (duration, the flow of events, and patient's satisfaction)	**Duration** Attended the patient on time Maintained the appointments as scheduled **Treatment outcome** Appreciable performance in sequencing the treatment procedure, monitoring the treatment outcome periodically and accomplished the target (e.g., restoring the esthetics, functional ability, and psychological well-being) **Patient's satisfaction** Engage the patients in shared-decision making (SDM) Maintained patient's privacy and dignity Enquired patient's clarity about post-treatment instructions and follow-up care. Delivered compassionate patient-centered care.	**Duration** Made patient to wait for 5-10 min in the waiting room. Appointment is maintained to an extent as per schedule. **Treatment outcome** Good effort is taken in sequencing the procedure. Rarely assessed the process for expected outcome; however patient's expectation was fulfilled. **Patients' satisfaction** Minimal engagement with patients in treatment decision. Maintained patient's privacy and dignity. Post-treatment and follow-up instructions are explained but not bothered about patient's understanding. Delivered considerate care.	**Duration** Made patient to wait for ≥10 min in the waiting room Appointment scheduling is inappropriate (too lengthy or too short for a particular procedure). **Treatment outcome** The procedure is sequenced haphazardly. Unacceptable treatment outcome. **Patient's satisfaction** Patient was not involved in the decision-making part. Respected the patient's privacy and dignity but made no effort to emphasized on post-treatment instructions and follow-up care. Treatment care was unyielding.
6	Learning outcome regarding professional standards, ethics, and an added notes on most satisfied component (mention events like but not limited to) Executed prompt service Empathetic care for the patient.	**Professional standards** Honesty and accountability was well maintained in patient care. **Ethics** Provided all information about the treatment with appropriate relevance and clarity. Obtained informed consent before performing the procedure	**Professional standards** Maintained honesty throughout the procedure. Effort made to sustain the accountability in patient care. **Ethics** Provided limited information about the treatment. Obtained informed consent before performing the procedure.	**Professional standards** Not concerned about professional standards. **Ethics** No effort was made to provide the treatment information to the patient. Obtained informed consent as a routine.
7	Need for any support or assistance to progress in a specific skill that was accomplished in this procedure, if yes, please specify	Identified the gap in the expected level and attained the state of knowledge, skills, and problem-solving capacity in different scenarios, and created a remediation learning plan	Determined the learning needs but could not plan the remedial measures independently Obtained professional help when the situation demands	Unable to handle the condition independently. No clarity about the given scenario. Professional help was expected repeatedly.

[Table/Fig-3]: Self-assessment rubrics.

questionnaire. The members assessed for face validity, content validity, construct validity, and criterion validity. The kappa value obtained was 0.78 with a significance value of 0.002 and a 95% confidence interval of 0.64-0.86 representing a good agreement between the reviewers.

The comprehensibility and feasibility of using the worksheets and questionnaires were tested by conducting a pilot study by using a subgroup sample (n=30) enrolled in the first academic batch participants. Since the results were satisfactory and credible among the pilot tested samples, authors considered the test instrument to be comprehensible and feasible. Thus, the test instrument was implemented in the present study.

The worksheets were handed over to the participants and asked them to reflect on one clinical performance every week, individually and independently and submit 12 reflective worksheets over four months. After completing every worksheet, the students were encouraged to assess their performance using the self-assessment rubrics and share their reflections with a designated faculty member. The reflective worksheets were collected from the participants on a monthly basis and numerical codes (SR 1, SR 2,

1. Are you familiar with the objectives of reflective learning? 1. Yes 2. No
2. During reflection, which quality of your practice is positively changed? 1. Understanding patient's expectation(s) 2. Developing an individualised treatment plan 3. Procedural skill (please specify the subcomponents) a) accurate steps, b) performance efficiency, c) matching with a checklist criterion 4. Procedural outcome (please specify the subcomponents) a) consideration of time taken, b) flow of events, c) patient's satisfaction, d) management of unexpected events 5. Learning outcome (please specify the subcomponents) a) Professional standards, such as adhering to the sterilisation protocol, respecting patient's needs, maintaining clinical records, and ethics.
3. During reflection, which aspect you noticed as unfocused thus far in your practice? 1. Understanding patient's expectation 2. Justifying the treatment plan 3. Procedural skill components (please specify the subcomonents) a) accurate steps; b) performance efficiency; c) matching with a checklist criterion 4. Procedural outcome (please specify the subcomponents) a) consideration of time taken; b) flow of events; c) patient's satisfaction; d) managing unexpected events
4. Is there any essential aspect of practice that is missed in the worksheet? 1. Yes 2. No
5. Is it possible to improve your learning and performance by this reflective process? 1. Yes 2. No Please state a reason for your answer.
6. Would you like to adopt reflective practice in future learning? 1. Yes 2. No
7. Did this reflective practice outcome match with your faculty feedback? 1. Yes 2. No Please state the similar and contrasting feedback statements.
8. Which aspect seems more difficult for you in the reflective practice worksheets exercise 1. Time requirement 2. Recollecting information 3. Additional work 4. Mismatch between idealism and reality

[Table/Fig-4]: The 8-point close-ended questionnaire to estimate the personal experience of participants in the reflective practice.

SR 3, SR 4…. up to SR 12) were given for all 12 sheets submitted by each participant (n=247). Authors analysed 2,964 worksheets, and presented a few representative samples [Table/Fig-6a-c]. Though the data obtained from the reflective worksheets was qualitative, the data obtained from the close-ended and Likert's scale response questionnaire was quantitatively assessed. The obtained data were entered in the excel worksheet for analysis purpose. The percentage frequency of the participants responses were calculated using SPSS software version 20.0.

Parameters of the 7-point questionnaire	Strongly disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly agree (%)	Total
Reflective practice is important in clinical training		14	4	18	64	100.00
Comfortable in using the reflective worksheets			18	50	32	100.00
Reflective practice led me towards self directed learning	4		7	14	75	100.00
Confident in transforming my reflective experiences into routine practice		10	11	61	18	100.00
Able to translate my perspectives on previous experiences into subsequent practices		4	7	75	14	100.00
Performance has improved after reflective practice			11	11	78	100.00
Able to provide consistently high-quality dental care through reflective practice				14	86	100.00

[Table/Fig-5]: Participants' responses to the 7-point questionnaire on a 5-point Likert scale.

RESULTS

Analysis of Participants' Reflective Experience

All the participants answered to authors close ended feedback questionnaire (100% response) and there is an overall (93%) agreement that the worksheet covered all essential features of dental practice. The percentage frequency was calculated to interpret their

Worksheet number	Reflection on experience	Reflection for action
1	I could not to summarise the history of a patient's problem as of its onset.	I need to record all the problems conveyed naturally to determine the final problem that led to patient's visit.
4	My patient was referred by a diabetologist for a dental check-up. The patient was keener to receive a summary of the dental consultation than receiving the dental treatment. Based on my experience, I managed to explore the patient's unrevealed dental problems precisely; however, it was difficult to match the patient's problem with treatment expectations.	I should acknowledge the patient's version and make them understand my concern. Need to extend my discussion to plan the pace and how to offer appropriate care.
9	My understanding and pre-planned efforts led to the precise exploration of the nature of the patient's illness, difficulties, and perceptions about the treatment	Consistently ensure the accuracy of the description of illness and patient's treatment expectations.

[Table/Fig-6a]: Reflective worksheet samples revealing the reflection on describing patient's illness and expected dental care on the first, fourth, and ninth reflective worksheets of a same student.

Reflection on experience	Reflection for action
Based on my subjective perception of the informed details of a patient's pain and discomfort with the full crown restoration, I deduced endodontic procedural error as a reason and prescribed radiography for further assessment. The image interpretation suggested adequate root canal filling with no periapical and periodontal changes. Hence, I listed the following reasons and solutions: 1. Missed out accessory canal: root canal re-treatment 2. High points in the restored crown: correct the occlusion by crown adjustment 3. Inflammations of the periodontal ligament fibers following the root canal treatment: Prescribe analgesics, wait and observe. When I discussed the plans mentioned above with my clinical teacher, he examined the patient and advised me to enquire about bruxism habit. I did not think of this possibility and missed the complete intraoral examination to determine the cause of this problem. Thus, I re-explored the history and examined the entire arch to determine the cause as clenching aggravated pain on the endodontically treated tooth, suggested splint therapy, and taught proper jaw positions during rest and occlusion.	Considering a complaint as a localised problem about the tooth might not be helpful all the time. I need to examine the entire oral cavity and diagnose both the revealed and unrevealed problems. The best treatment plan is devised only after obtaining the complete picture of signs and symptoms.

[Table/Fig-6b]: Sample reflection notes of a participant on reasoning and problem-solving skill.

Reflection on experience	Reflection for action
Because the patient had an ideal dental arch and teeth alignment I decided a space closure for 1.5 mm diastema using Renamel Microfill composite material without compromising the incisor structure. I performed the procedures including rubber dam placement, and etching, restoration, curing, finishing and polishing of the margins for one tooth. By placing a clear matrix strip interproximally, I added the material on the second tooth and finished restoration similarly by adhering to the checklist criteria. In addition, checked for any overhanging material and ensured proper contouring. Then final finishing and polishing were performed using appropriate burs, finishing strips, and flexi-buff. Finally, the midline and smile curve were perfectly aligned. I provided home care instructions and insisted a follow-up visit after 6 months. The patient was happy with the aesthetics, time, and cost of the treatment and rated the treatment choice highly because her inputs were considered in shade selection and final contouring. On self-evaluation of the treatment outcome, I realised a need for improvement in using appropriate paintbrushes for attaining optimal natural effect on the enamel shade.	I need more practice for direct resin restoration that needs tooth preparation. Before the clinical performance, I like to use a typodont model for learning challenging procedures and handling various instruments for attaining appropriate surface characteristics and polishing.

[Table/Fig-6c]: The reflection of one participant on skill-product (performance) after performing a composite material restoration for midline diastema closure in SR 7.

responses [Table/Fig-7]. The majority of the participants (89%) were familiar with the objectives of reflective learning. When specifically analysing the independent factors, 29% of the participants revealed that their skills of developing individualised treatment plans were enhanced by reflection. Further, 14% of the participants opined that their professional standards and patient satisfaction components of their clinical practice were improved. Regarding procedural skills, 11% of the participants expressed that they adopted the procedure standardisation criterion checklist for achieving the learning outcomes.

During reflection, the participants realised that in their practice, they did not give sufficient importance to the following factors:

- The justification for their proposed treatment plans (22%);
- Following the steps in an orderly sequence for every procedure (students had the habit of skipping some intermediate steps and prematurely moving to the next level) (32%).

The participants (72%) opined that their learning and performance were improved through reflection and interested in using structured reflective practice (76%). The reasons given for improved learning through reflection include, but were not limited to: a greater focus on professional standards, adhering to checklist criteria and cares for patient satisfaction. A lack of experience in the assessment was given as an explanation for uncertainty in improving learning and performance.

- No reason was stated for refusing to use reflection practice.
- When the participants assessed their performance by reflecting on the previous experience, they recognised that their appraisal outcomes did not match with faculty member feedbacks, particularly regarding time management, the flow of events, and the clinical record maintenance (54%).
- While adopting the tool of reflective practice, 57% of the participants experienced a mismatch between idealism and

S. No.	Parameters	Response	Frequency	Percent
1	**Familiar with the objectives of reflective learning**	Yes	221	89.5
		No	26	10.5
2	**During reflection, which quality of practice is positively changed?**	Developing individualised treatment plans	71	28.7
		Following accurate steps while performing a procedure	27	10.9
		Performance standards matching with checklist criterion	26	10.5
		Time management	10	4.0
		Flow of events	18	7.3
		Patient satisfaction	35	14.2
		Professional standards	35	14.2
		Ethics	25	10.1
3	**During reflection, which aspect you noticed as unfocused thus far in clinical practice?**	Understanding patient's expectations	9	3.6
		Justifying treatment plans	54	21.8
		Concern regarding treatment time	35	14.2
		Patient satisfaction	26	10.5
		Managing unexpected events	26	10.5
		Adopting accurate steps for a given procedure	78	31.6
		Learning outcomes	19	7.7
4	Is there any essential aspect of practice that is missed in the worksheet?	Yes	18	7.3
		No	229	92.7
5	Is it possible to improve your own learning and performance by this reflective process?	Yes	178	72
		No	69	28
6	Do you like to adopt reflective practice in future learning?	Yes	187	76
		No	60	24
7	Did the reflective practice outcome match with your faculty feedback?	Yes	114	46
		No	133	54
8	The most difficult aspect in using structured worksheets reflective practice	Time requirement	9	3.6
		Recollecting information	70	28.3
		Additional work	27	11
		Mismatch between idealism and reality	141	57.1

[Table/Fig-7]: Frequency table showing participants' responses to the 8-point close-ended questionnaire.

reality and found this part to be tricky in this exercise. Further, 28% of the participants raised concern regarding recollecting incidents but not when the incidents occurred.

Analysis of the Participants' Perception about Reflection

All the participants responded to the questionnaire survey (100% response rate). Analysis of the five-point Likert's scale feedback questionnaire revealed that 159 subjects (64%) strongly agreed that reflective practice was necessary for clinical training, whereas 4 (14%) disagreed with this point [Table/Fig-5]. Only 1 (3%) participant could not decide on this and remained neutral. A total of 124 (50%) participants agreed that they were comfortable in using the structured reflective worksheets. Approximately, 186 (75%) participants strongly agreed that self-directed learning was possible through reflective practice. The participants agreed with the possibility of transforming reflective experiences into routine practice (61%) and on the ability to translate their perspectives on their previous experience into the subsequent practices (75%). An 86% of the total participants strongly agreed that it was possible to provide consistent high-quality dental care through reflective practice. The results positively relate the participants' perception about the reflective practice and the structured reflective worksheets.

DISCUSSION

The reflective skill enhances learning in multiple domains, hence considered as a core skill [22]. Authors introduced structured reflection in clinical dentistry by incorporating six essential domains in the reflective worksheet. Since reflection is characterised as a "meta-cognitive process [23], authors structured the worksheet for guiding the beginners to: (i) precisely reflect on the knowledge, skills and emotional components [24]; (ii) recognise all the essential features to be adopted in a clinical procedure; and (iii) self-assess what has been performed and where modifications should be made. This level of guidance and clear instructions are essential for novice practitioners to develop good reflective skill as mentioned in the review work of Dyment JE and O'Connell TS [25]. The participants were asked to reflect on their performance and learning and to reflect for future actions to improve the performance.

Teaching and Assessing Reflective Learning (TARL) framework developed by Ryan M and Ryan M, described four independent variables that could influence the reflective practice [26]. The variables are; the developmental stage of the learner, learning context, the expectation of the lecturer, and the diversity of the learner. The influence of these variables in the results of the present study is reduced by using a homogenous study sample from a single institution (internship students). This reflection exercise also intended to inculcate self-assessment skill to test their performance level and take responsibility for own learning [27]. The intention is, by doing the self-assessment repeatedly, students will design the corrective measures consciously and also be self-motivated to improve their performance consistently [28]. The internship students have prior knowledge about the clinical procedures and familiar with the assessment methods (done by the faculty members), hence authors selected them as a study group and asked to assess their own work by using a rubric.

When the participants first used the reflective sheets, they admitted that they were vague about clinical skills like the justification of the treatment plan (22%) and executing the accurate steps in perfect order for a procedure (32%). Participants (78%) also strongly agreed that they have improved the same skills when switched on to reflective practice. During the follow-up discussion, the students revealed that self-assessment rubrics enabled them to understand the shortcomings and merits of their knowledge and their performance. When analysing the reflective sheets, authors could recognise the gradual improvement in the reflection skill of individual participants [Table/Fig-6a-c]. Regarding the difficulties in using worksheet, only 11% of the participants expressed it as additional work and 4% as time consuming process. This part of the result enlightens the participants' acceptance of the ease of structured worksheet reflection and hence can be considered as an effective tool to overcome the issues associated with other reflective tools [18].

Though the present participants accepted the benefits of reflective practice, they did not unanimously acknowledge the ease (18%) and importance (17%) of using the structured worksheets in their clinical training. When authors enquired about this in the discussion, some students denied the act of critically reflecting on skills and knowledge. The conversation made us realise that some participants are not willing to replicate on the previous problematic and/or poor experiences and this aspect demand to be addressed. The participants (57%) also expressed that the most challenging part of structured reflection was the mismatch between idealism and reality. When this aspect of the study was further analysed during the feedback session, they criticised about the inadequate training in the management of unexpected events, recording incident reports, and shared decision making. Also, many participants (54%) expressed the contradiction between the faculty feedback and their perception about the performance. Authors discussed this conflict, and the participants said they were more specific in adopting the rubrics whereas faculty members' assessment was based on circular reasoning. The study signalled the modifications to be implemented in the present teaching-learning and assessment methods as well.

LIMITATION

Students' perception of data alone cannot be considered as an authentic tool to measure the effectiveness of reflective practice. The impact of reflection on the daily practice is needed to be analysed by authentically measured improvement in the performance.

CONCLUSION

The success in professional practice is beyond the concept of grading and certification. Students need to become critical thinkers and problem solvers by the self-appraisal of their performance. Informed by this study, reflective worksheet structured with clear objectives facilitated learning through self-assessment. The exemplary worksheets of the participants and their acceptance for using the worksheets signify the effectiveness of rubric guided, structured worksheet, therefore, can be considered as an appropriate tool for developing reflective skill and self-assessment ability for the dental students. The participant's acceptance of the usefulness of this practice in enhancing their performance and their willingness to include reflection in future learning add further value for implementing structured reflection as a part of clinical training in dentistry.

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PARTICULARS OF CONTRIBUTORS:
1. Associate Professor, Department of Health Profession Education, Sri Ramachandra Institute of Higher Education and Research, Chennai, Tamil Nadu, India.
2. Vice Chancellor, Department of Health Profession Education, Sri Ramachandra Institute of Higher Education and Research, Chennai, Tamil Nadu, India.
3. Associate Dean of Education, Department of Health Profession Education, Sri Ramachandra Institute of Higher Education and Research, Chennai, Tamil Nadu, India.
4. Professor, Faculty of Dental Sciences, Sri Ramachandra Institute of Higher Education and Research, Chennai, Tamil Nadu, India.
5. Professor, Department of Community Medicine, Sri Ramachandra Institute of Higher Education and Research, Chennai, Tamil Nadu, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:
Dr. K Anbarasi,
Associate Professor, Department of Health Profession Education, Sri Ramachandra Institute of Higher Education and Research, Porur, Chennai-600116, Tamil Nadu, India.
E-mail: anbarasi@815@gmail.com

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