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Supervising and Managing Student Projects

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Abstract— ***Supervising and managing student projects can often be a pain for teachers. They may be striving hard to get projects done by the students without following a designated path, which rather ends up in chaos. Often the projects are incomplete and students get lowered grades as they lose marks. However sticking to some principles, this can be avoided. Making the students want to do the projects in their own interest under supervision of the teacher is the key to the issue. For this to happen, the projects must themselves sound interesting. Not only this, but the supervisor should guide them in a systematic way with a plan in mind. If the some theories are needed as a backup for the projects, they should be delivered in small portions. Words of encouragement should be poured in as when needed. Grading should be done as fairly as possible and there should be some scope for improvements in the grading policies from time to time. Students should be encouraged to ask questions to get a strong grip on the projects right from the beginning. The sign "You are important" must be upheld by all instructors. They must be in control of high-stress situations and be able to read students. As far as possible they must be dedicated to their supervision job and not abandon students halfway through. While supervisors do a good job, students have their roles as well. They must conform to some rules for their integrity of projects and finishing on time. This paper touches on these points with views to how supervisors should be supervising and managing projects diligently and efficiently, at the same time how students should be working in coordination and harmony with the instructors.***

Keywords-"I want to do it" motto, Interesting projects, "You are important" vision, SMART rule, Effective Teamwork

Introduction

Arousing "I want to do it" motto in the students is the foremost step. Students should not simply be imposed upon projects. Rather they should do them willingly, enjoying and loving to work on them. So the role of the instructor also comes into play. He should hand out interesting projects and have a map in hand to lead the direction till the end. Disorientation from the direction may lead to improper guidance, incompletion of work and even disasters. Disasters can be bickering language from the students, heated arguments between teacher and students, lowered grades, unpopularity of the teacher and extreme dissatisfaction on both sides. As far as possible, background knowledge for the projects should be disseminated little by little. It is better to expose to the students the required knowledge in small doses which the students can grasp rightly day by day and accumulate them duly to form a vast resource. A drop of compliment and fair grading should be ensured from time to time. This is needed to enliven the spirits of the students. Teachers must clarify doubts by answering enquiries of students as logically as possible. While they manage and supervise, there is also scope for them to learn from their students. So discrimination among the students on the part of the teachers should be as negligible as possible. They should also know how to control their students, read them and act accordingly. They must give full dedication to their jobs and make the students understand that the student's role also is important. For example, the students must be determined and start their work head on early. They must respect the teacher and abide by the rules. When forming teams, a team leader should be chosen who will coordinate the teamwork with the team members compromising and cooperating with each other and contributing equally to the project for benign outputs.

I. Making Students Do Things In Your Way

The key to making students do projects in your way is simply to make them want to do it. That is, they should not consider the projects a burden but willingly work on them. For example, they may be informed how their projects are going to help them. For instance, these projects can be expanded later to form thesis projects or they can utilize the project results for another lab project or simply they can show their experience in the projects as part of their resumes which may enhance them to get jobs in the related sectors after they graduate.

Secondly, from the very first class, a clear idea of what you want from them must be given. For example, I have taken database labs several semesters. I start the first class, asking them what they know about databases. After defining databases, I introduce to them back ends and front ends of database management systems and that they too need to work on database project systems. For example, for backend design, I write the following points [1,2] on the board which they need to cover in the lab:

1) *Entity Relationship Diagram*
2) *Relational Model*
3) *Normalization of tables*
4) *Implementation in SQL server*
5) *Usage of the system via SQL complex queries*

They don't understand much but at least they know what terms to expect. Then I give them ideas on entity relationship

diagrams (ERD), what entities, attributes and relationships are and give them sample examples. In the second class I give further complex examples of ERD and introduce to them relational models that is, converting ERD to relational tables (table schemas). By the third class, I will be testing the taught lessons via assignments and then teaching them how to design a small database in MS SQL server to give them a feel for databases.

I always recommend training students on designing a mini database system first before throwing bigger, challenging projects at them and introducing to them broader terms such as normalization of tables which can be covered later. The key to this is to guide them in a systematic way at the same time, making your students interested.

II. Making your projects sound interesting

In my database labs, I give them ideas on what database system projects they can work on like bank, hospital, post office, software companies, food restaurant etc. All these are real-life examples. I prefer that my students work on these examples which help them to get acquainted with how an organization works in real-life. However, I let my students choose the topic and be creative so that they like doing it and get fun from it and learn at the same time, not just as a must-to-do-task to earn their degree. I ask them to personally go to the organization of their choice and get live information from there and hence on start working on ER-diagrams. This is where the thrill of the projects begins.

I am also supervising undergraduate thesis groups on databases. Once one group said they are not interested in designing front ends of the database project they are working on but they want to convert algorithms to programs. It is really your concern to make your students interested. I thought for a day and told them later they could design the back end of their current blood bank database system and convert database tables to text files and mine them for example, write programs for algorithms that match pattern strings in question with the content of text files and that will return exact matched strings or approximate near-matched strings from the text files and also show the edit distance between the input query string and the returned program output string. [3] My students immediately were back on track, eager and interested.

What more, in the current semester, after I showed my students how to design a small database in SQL server, days later they flocked towards me asking me where they could get a grip of SQL server setup file. They wanted to install and practice at home. I had definitely tuned my students in my way. They actually were interested!!

At this point, I remember as a PhD student of University of Texas at Arlington, USA, I was given individual project assignment on Distributed Systems via Clients and Server. Although I did not seek help from professors and TAs, I interacted with forums to work on the project. I worked day and night and could think of nothing but coding on the project. The fact is I had enough time but I worked day and night because I could not stop myself. The project was so darn interesting!! I am still thankful to my professors there for giving me such an opportunity to get so much enthusiasm and excitement from the particular project.

III. Guiding the students in a systematic way

As for mini lab projects, the best way to manage them is as I mentioned in Section I to train your students on a sample mini project for example a mini database system in my case. Working on a small mini project already, they are able to simulate their ideas better when given bigger and broader projects. They are able to apply their knowledge and work out their way on how to complete their projects. I also tell them to break down their bigger projects into smaller ones and tell them to proceed step by step with the modules and integrate all the small steps into a bigger one. [4] This really puts off heavy pressure on them. Because I have to take into account the fact that they not only have my course projects but other courses and projects from other labs to take care of. I finally make them present their work in the form of a project report. I also take care to have my students demo their projects to see if they are really working.

For undergraduate thesis projects, guiding students in a systematic way is also important. For example, for one thesis group, I had not taken their database lab in their previous years. They knew databases and all the materials in it taught by a different teacher. Often teachers have different ways of explaining the same concepts/terms. I believe students should be aware of how I see those terms or concepts. Instead of clashing with the other teacher, with this group I sat down to show them my way of looking at the concepts and my viewpoints. So those students came to know how to draw entity relationship diagrams, convert them to relational models etc much lucidly in a way I would like them to do.

While being a student of both masters and PhD programs, I can draw a line here. I can now visualize why I was able to get a master's degree promptly but not a PhD degree. I do not blame anyone here. But I most frankly must say my supervisors of master's program proved to cater for better guidance. There were those little moments they provided useful advice that I was able to carry on. On the other hand, PhD thesis project advisors simply loaded on me tasks after tasks with little or no guidance. Had I received a little better supervision, I am sure today I would have been a proud holder of a PhD degree. I am not saying supervisors should tell solution to the problems but a small shred of advice and suggestions would not hurt.

Even here in my country, some supervisors who manage masters and PhD thesis projects are engaged in good many activities and events so that they are unable to give time for supervision. They just bombard tasks upon students and ask them to help themselves. While this is quite ok with the best and good students, the not-so-good students are sometimes lost in their projects for lack of guidance and in the process, they change universities hunting for good advisors, losing precious years of their life.

IV. Having a Plan Prior to Supervision

Often instructors have impromptu ideas of leading projects. However I believe a plan prior to supervision of projects is necessary. As I have already outlined what I should be doing for my database labs, I know what direction my projects should go. For example, if I take the backend design of my projects, the step by step points mentioned in Section I are noteworthy.

The same goes for my thesis projects. If some modifications need to be made as I mentioned in section II, I do them head on early. It is important that you see the direction and hence enable your students to see the same direction so that no catastrophe results.

As Leonard Bernstein, composer in Reader's Digest said "To achieve great things, two things are needed: a plan and not quite enough time." [5] How right he is!! A semester is only a short time and completion of projects in this short span definitely requires a plan on the part of the teacher.

V. Throwing Information in Small Chunks

It is not advisable to throw a lot of information into students' faces in one go. The brain can only capture to an extent. The students will be exhausted and yawning. For example, for my projects, I need to acquaint them with some theory stuffs which I deliver only in small portions. The next time I review them, give them tasks to test them and introduce to them further smaller chunks of information. This keeps the ship at bay.

VI. Passing Words of Encouragement

"Be hearty in your approbation and lavish in your praise". Dale Carnegie insists in doing this to win friends and influence people. [6] I do agree with Mr. Carnegie that passing words of encouragement for the slightest improvement in a student's performance can work wonders. When they do a good job, it is just to give them sincere appreciation. That definitely upgrades the performance of weak students and for the good students, it brings out the best in them. A good teacher understands this trait and does not forget it.

Of course that doesn't mean you should not correct your students' mistakes and make them aware of them. You should point out the mistakes they make and make comments tactfully and rigidly. If they do not produce good output or do not show their work in due time, be strict not harsh. Make them understand you expected better performance. Gone are the days of brutal manual punishments and now let be gone of severe criticisms. It is wise to be kind and loyal to your students while they work on their projects while at the same time, conforming to your rules and principles.

Once at one point, in a thesis group, one student was doing well in his tasks. I encouraged him in front of others. Another student performed poorly on performing normalization of tables. Did I scold him? No, I showed his mistakes and told him I expected better from him. Days later, he frequently cleared his questions on normalization from me. By the second semester, he was designing front end of the database system. He demonstrated several form designs. They were remarkable simply. Did I keep that to myself? No, I was lavish in my compliments.

Every human being craves for compliments. It boosts their feeling of importance. If we, the supervisors can boost the self-confidence of our students by dropping compliments for a rightly deserving good work, it is not a bad thing at all. I remember during my PhD thesis project, I was wavering like a distraught person, feeling homesick and distressed because I was loaded with tons of tasks and yet when I showed some of my work, I confronted only a grim face of my supervisor and more orders of tasks and not one word of encouragement. Let us not be like my gloomy supervisor but more enlivened and full of spirits, ready to pass on compliments for a well-deserved project and making someone's day jubilant.

VII. Grading the Projects

Grading a project should be progressive. I mean the students' performance should be judged at every step incrementally and recorded. They should be graded for all the portions of the project fairly. So far no student of mine has been able to complain his grade was miscalculated. A good teacher observes his/her students closely. S/he encourages the good ones and helps out the needy ones. A balance has to be maintained.

In my university, there is a rule that if students fail in labs, they have to repeat the semester. While this is a hard constraint on the teachers, they consider a student's situation if they fail him/her in a lab and ultimately give them grace marks and pass them. This issue has been taken up in several important exam committee meetings with no alteration to the rule. As Aesop, hundreds of years ago showed us the policy where there is a will, there is a way, our department chairman came up with a new grading policy of distribution of marks. He suggested that by mid of the semester, we should grade on 40% of our students' lab performances on attendance, performance, quizzes, assignments and projects and finalize them and let our students know their 40% marks. At the end of the semester we should grade on remaining 60% performance. This strategy worked wonders for my lab projects. While prior to this new grading scheme, I had struggled with one or two of my students for passing them in lab projects, this new scheme brought a new array of hope. Once the new scheme was implemented, my students did not waver with the margin of failing projects. Instead the least grade for my projects was a C+, not even a D. The point I am trying to make here is that given the rules, you can make alterations within your boundaries to improve grading policies of projects.

VIII. Encouraging Students to Ask Questions

My foremost advice is always to encourage your students to ask questions. Do not be offended if it is a stupid question but answer it as logically as it would make sense to the student.

When students have their questions answered, they are clearer about what they have to do and who knows may make a praiseworthy breakthrough. Let them be as inquisitive as they want to be and give them time to answer their questions. It is even advisable them to give them some allotted counseling hours for their enquiries.

IX. "YOU ARE IMPORTANT" VISION

Carnegie in his book quotes Emerson saying, "Every man I meet is my superior in some way. In that, I learn of him." [6] It is obvious a teacher is definitely more experienced and learned than a student and it is the teacher who guides the students during their projects. But in some twilight moments, it is the student who impinges on a new idea or shows the teacher a new horizon to a project problem. In that a teacher learns of the student. There is nothing wrong in learning from the students. Life is itself a continual learning process.

Therefore if a student is shy or slow to respond, let the teacher not undermine the student's abilities. In fact he should have "you are important" vision for all students unanimously.

This vision on the part of the teachers also applies to students of multi cultural communities in an institution. They are all there to learn. Show them the way impartially and holding them in dignity.

X. READ STUDENTS

An efficient supervisor is able to read his students. He understands verbal and nonverbal signals and reacts to the needs of the students sending these signals. [4] A verbal signal is for example, students are asking too many questions. The supervisor is not able to proceed with his planned agenda. He must know how to control the situation. For example, he may answer up to five questions and settle that he will discuss further queries in his counseling hours in person. Nonverbal signals can be a student or two are sitting idle in class doing nothing. It is up to the supervisor to arouse interest in them.

XI. HIGH-STRESS SITUATIONS

For example, in a class of twenty students, when I demonstrate designing a mini project via projector, a good many students are slow to catch while other students remain in pace. It becomes a high-stress situation to personally look into the errors the slow students make who are actually following the steps in my design on their personal computers. So I assign the in-paced students to show the slower students and the class gets eventually back in control. The key point here is a teacher must remain under control in high-stress situations. [4]

XII. LEAVING STUDENTS HALF-WAY

When a supervisor takes the responsibility to be in charge of a project, he should ensure he is the person who will be there to guide his students through out. Often supervisors leave their jobs halfway for better jobs or higher studies. In that case they are hardly deprivers but the real sufferers are the students.

In case of a change of a supervisor, students may feel lost, unable to comprehend the new supervisor from the middle of nowhere. The new supervisor may not be informed of the old supervisor's directions and orientations. He may be lost himself unable to cooperate with the students.

In many institutions of my country, everyday teachers are either changing jobs or going abroad. When it comes to supervising undergraduate or graduate thesis projects, these teachers are much self-oriented and do not consider the destiny of their students. Students desperately look for substitute advisors. If they are lucky, they will complete their degrees in due time. If unfortunate, they are in the danger of losing valuable time and may not even reach their long dreamed goals of life.

XIII. RULES STUDENTS MUST CONFORM

The teacher must make it clear to the students that he is willing to cooperate and give his best advice. But on the other hand, he also needs cooperation from the students. In general, the instructor must make sure that the students conform to the following rules.

A. Rule 1 (SMART Rule)

Students must surely follow Rule1 to set a goal for finishing projects. [5]

S is for Specific: Instead of setting a goal, "I want to finish the project", let the student set a specific goal for example, "I want to complete the project in database lab on "BIRDEM Hospital Management" by July 7, 2010.

M is for Measurable: While aiming to complete the project by the end of the semester, let the student define a goal that can be measured. For example, let him define an estimate of the number of days he will allocate to each module of the project.

A is for Achievable: Let the student not aim to do a project on a very low, detailed level. For example, a database lab project is ok with designing a system considering 5 to 6 entities. But aiming for 12-20 entities is much too complex, more suited to a thesis project. No need to aim for the stars in one go - baby steps are good too.

R is for Relevant: Many of the students choose projects that seem right but are in fact vague and confusing. A few weeks down the track, the projects fail to inspire. Let the students choose projects, if he has the option, that really speak to him and he is somewhat familiar with them.

T is for Time-Conscious: Finally, let the student be very clear in his mind about how much time he is giving per day to complete the project. That way he knows he is on his way to success or failure or whether he needs to work harder to make the deadline.

B. *Rule 2 (Do Projects for yourself)*

The projects students do should not come from an external force or drive. Instead of saying to himself, "I am doing this project for my family", he should be saying for example," I am doing this database project because it will help me to be familiar and gain experience in the field. I may find a job in the field of databases after I graduate" or "Having finished this project, I will understand the theoretical aspects better." [5]

C. *Rule 3 (Do not go to the extremes)*

Let the student not overwork day and night. In Section II, I cited an example of my case in overworking a distributed system project. Either the project is too interesting or the student has run out of time, let the student not overwork. He needs rest like anyone else for proper functioning of his brain and body. In case of not enough time, student can always ask for an extended deadline if he is unable to finish even if he has worked hard and utilized his time. For cases of negligence and laziness on the part of the student, no one can help. He must pay his amends. He should have realized he needed to have worked harder from the beginning. Therefore, a student must not sit idle or be negligent with his projects from the start. [5]

D. *Rule 4 (Have respect for your supervisor)*

The supervisor is somebody the students can trust in guiding with their projects. He is more experienced and learned. So they must respect him. They should not go to unnecessary lengthy arguments if they do not agree with him on a point or two. Let the student discuss with a different mentor and see if that helps him.

If a supervisor makes little blunders, let the students pinpoint them but not lose respect for him. No human being is perfect. After all, to err is human.

If the supervisor is not sincere with his guidance or incompetent to cater guidance, let the students not accuse him openly. Let him save face. [6] The students can first talk the issue gently with him. There are other actions that can be taken. For example, they can seek higher authority help. They should never swear at the teacher or use bad language or threaten him. If they do, institutions may take legal actions against the students as having committed a minor crime or offense.

E. *Rule 5 (Assigning a team leader)*

If n students of a team (if it is a group project) are assigned m different functional tasks of a project module, relatively little combined work occurs. [4] Coordination can only occur through the assignment of a team leader. Also the team leader can communicate the progress of his team with the supervisor. If the supervisor has any suggestions, he will also interact with team leaders. Demos of final projects if needed can be put forward by the team leaders themselves.

When I guide my thesis projects of four-member teams, I always keep contact numbers of team leaders. If I am in a meeting or need to pass them some message, I always contact the team leader. That way my thesis project students never miss consultation hours with me. So I recommend that if there is a group project to manage, it is good to assign a team leader.

F. *Rule 6 (Effective Team Work)*

An efficient way to get good teamwork output is for the team to set up meetings and discuss what needs to be done by whom. This means a team meets on a date and finalizes according to the team leader what issues of the project each member will look up and write a proposal. The team can meet again and discuss the proposals and edit them and then each member will decide to work on and implement his portion of the project. On a final meeting, they will discuss ways of integrating the parts. All through the team leader will coordinate and be responsible for precise integration of the work.

Sometimes meetings are can be useless if no effective discussion takes place and no decisions are made as to how to divide up the work among the members. This means each member must compromise and learn more to cooperate and be open.

A supervisor can also decide to assign the work of a project module in subgroups of a team. For example, as my thesis project teams consist of four members, I tell subgroups of two in a team to work together on two separate tasks at a time, one task per subgroup and show me the results. That way better teamwork output is produced. Sometimes there can be a team leader per subgroup for even better coordination

For my database projects, I tell my students to work either individually or form a group of two. I believe for these projects, individually or groups of two are enough to complete the project. Adding a third member to the group, in my opinion will be very nonproductive.

When students need to form teams, it is better they interview each other and come to know each others' abilities and deficiencies. For example, one may be good in coding, and another in documentation. Then these two can form a group, dividing up the tasks for their required project. Also each team member needs to know the time schedule and locations of each other as similar timetables and living in close by locations promote effective and convenient communication. The main idea is for each member to be able to give time for the project. For example, it is risky to join with a member who has too many extra-curricular activities and external commitments.

Arguments between team members are best solved among themselves and via team leader. In extreme cases, they can contact the supervisor who will try his best to settle the situation. It is recommended that they do not cut anyone out of their teams or give the impressions they are well off without a specific member. They must really respect each other. In case of a multicultural team, this is even more needed with even better understanding among each other and better communication skills, devoid of all race colors in mind.

CONCLUSION

Guiding student projects in the right way cuts down disasters or catastrophes. Students should be led in a direction that the instructor has in mind. They should not be confronted

with surprises that end up in dead ends. As the teacher leads the way, they continue to work in small modules maintaining their interests and later unify them into one big module. Every student has hidden qualities and it is up to the teacher to tap out the qualities to be visible while doing the projects. [6] At the same time students must not forget they too have a role to play. They must abide by all rules, without giving trouble or creating chaos in class. When working in teams, the members must listen to the team leader and each must have his share of taking part in the project, resulting in a praiseworthy teamwork in the very end.

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